e-Front runners

Air Circuit Breakers BT2 Series

Fuji Electric FA Components & Systems Co., Ltd.

5-7, Nihonbashi Odemma-cho, Chuo-ku, Tokyo, 103-0011, Japan

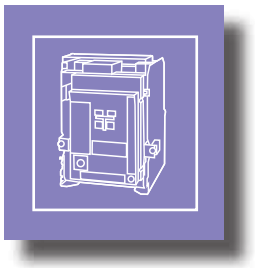
URL http://www.fujielectric.co.jp/fcs/eng

Information in this catalog is subject to change without notice.

VEGETABLE OIL INK

Printed in Japan 2012-1 Ed5 FOLS EEH606

Fuji Electric FA Components & Systems Co., Ltd.



Air Circuit Breakers

BT2 Series 1600 to 6300A

Contents

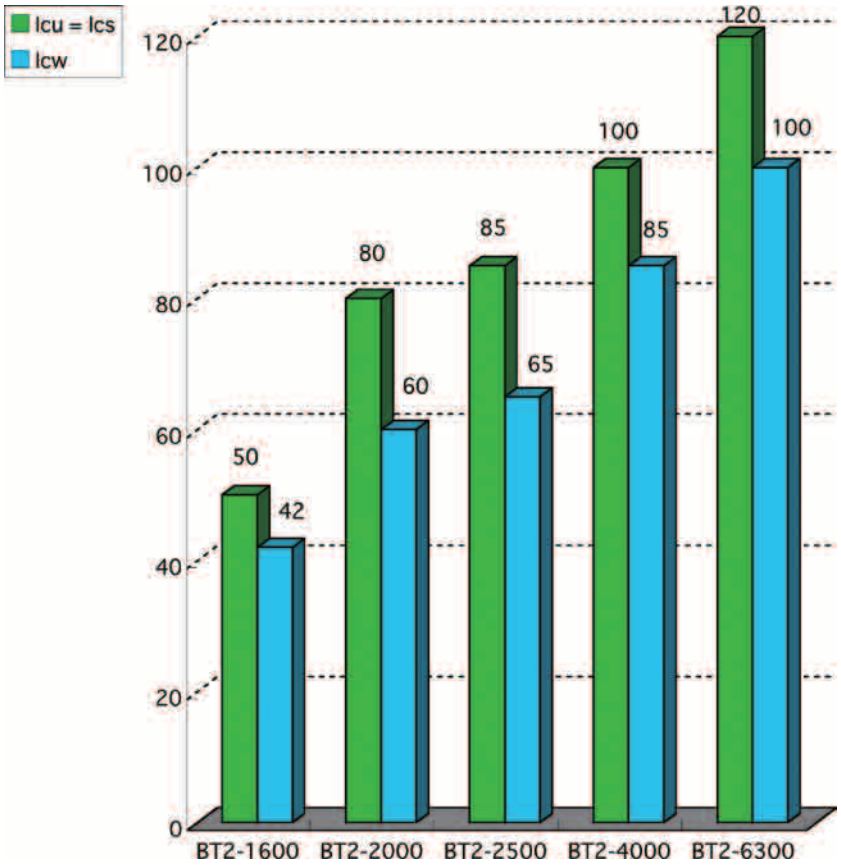
Features 3
Type number nomenclature 6
Specifications 7
Appearance 8
Intelligent controller (OCR) 9
Communication 14
Characteristics curve 16
Accessories 23
Technical data 28
Dimensions and mounting 30
Wiring diagram 54
Ordering form 62
Ordering notice 63

■ Selection guide

Series		BT2 series
Frame size		1600, 2000, 2500, 4000, 6300
No. of poles		3, 4
Installation	Fixed	Available
	Draw-out	Available
Closing Mechanism		Manual spring or motor spring
Tripping Mechanism		Shunt trip, Under-voltage trip
Protection function		Long time delay, Short time delay, Instantaneous, Ground fault, etc.

■ Breaking Capacity

Icu is equal to Ics up to 120kA at maximum and Icw is up to 100kA at maximum under 400VAC distribution.



■ Compact size

BT2 series, Air Circuit Breakers, have five framesize and four physical dimension sizes.

Ampere frame	1600	2000	2500	4000	6300
Appearance					
Width	248mm	347mm		401mm	767mm

■ Installation

The bus bar terminal of the BT2 series, Air Circuit Breakers, can be simply installed as follows:

- Horizontal connection
- Vertical connection
- Composite connection

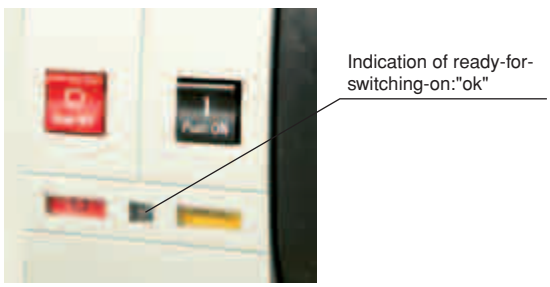
■ Safety performance

BT2 series, Air Circuit Breakers, are reliable by the following aspects:

- Reliable assurance of the three positions:
  - Connected
  - Test
  - Separated

by the locked and automatically unlocked mechanism at the draw-out socket.

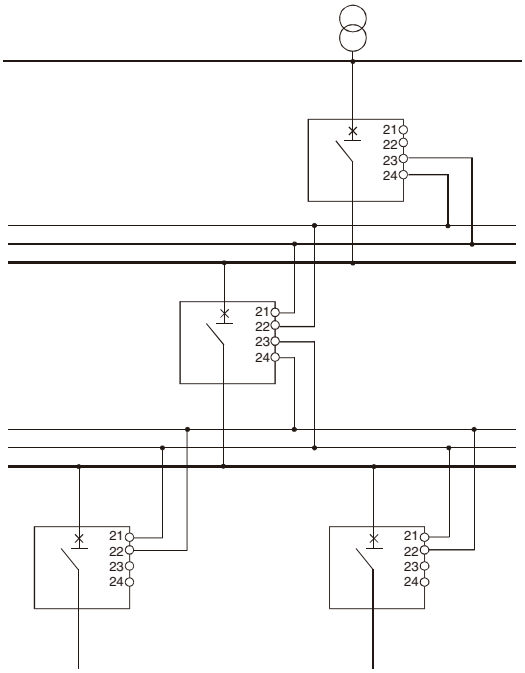
Clear indication of ready-for-switching-on to ensure safe manipulation and reliable operation.



More reliable safety protection with seconday terminals of protection grade IP30

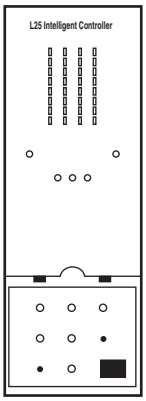
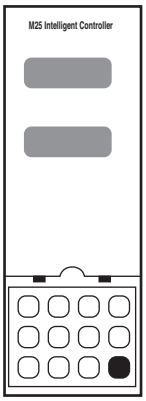
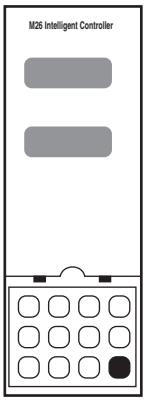
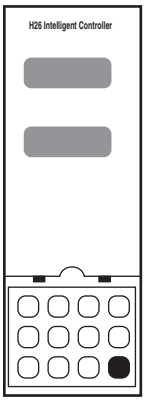
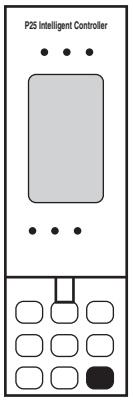
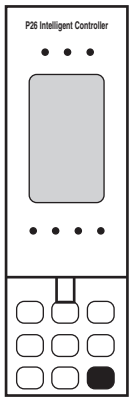
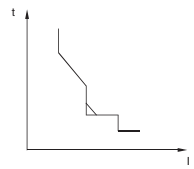
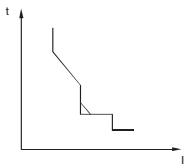
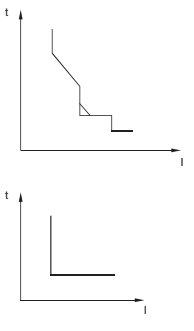
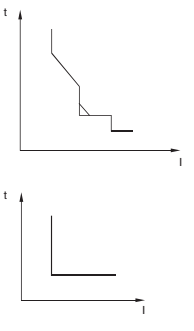
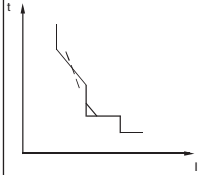
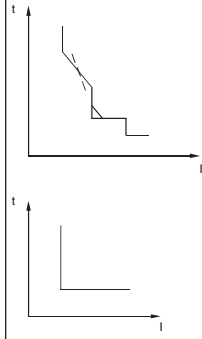
■ Protection and selection

BT2 Series, Air Circuit Breakers, can implement selective interlock of ZSI Region to ensure comprehensive selection of various protection and reduce the copper bar's bearing of thermodynamic.



■ Intelligent controller (OCR)

Selecting OCR's, it can be classified into six types

Type	L25	M25	M26	H26	P25	P26
	Option	Standard	Option	Option	Option	Option
Pic						
Display/setting	Light columnar indication Dial setting by knob	LED digtal indication Consecutive parameter setting	LED digtal indication Consecutive parameter setting	LED digtal indication Consecutive parameter setting	LCD indication Consecutive parameter setting	LCD indication Consecutive parameter setting
Protection/ function						

■ Type number nomenclature

BT2-2500P / 32500E □

Basic type

Frame size
1600, 2000, 2500, 4000, 6300

Installation
P: Fixed type
X: Draw-out type

Number of poles
3: 3 poles
4: 4 poles

Rated current
1600AF: 0200, 0400, 0630, 0800, 1000, 1250, 1600
2000AF: 0630, 0800, 1000, 1250, 1600, 2000
2500AF: 1250, 1600, 2000, 2500
4000AF: 2000, 25000, 2900, 3200, 3600, 4000
6300AF: 4000, 5000, 6300

CE version

OCR type or Additional accessories
• OCR type (note: M25 is standard), See page 9

Type	Code	Remarks
L25	L5A	
M25	– (None)	
H26	H6A	
P25	P5A	
	P5B	w harmonic analysis function
	P5C	w communication function
	P5D	w alarm of current-imbalance
P26	P6A	
	P6B	w harmonic analysis function
	P6C	w communication function
	P6D	w alarm of current-imbalance

• Accessories

Type	Code	Remarks
LED indicator of Voltage	C1	
Load-monitoring function	C2	
ZSI function (Zone selective interlock function)	C3	
Under voltage release	R1	Instananeous
	R2	Time delay
Switching OFF lock device	Q1	One lock and one key
	Q2	Two lock and one key
	Q3	Three lock and two key
Mechanical interlock device (Two sets of ACB's)	MW1	Steel lock interlock
	MB1	Link rod interlock (0,6m)
Mechanical interlock device (Three sets of ACB's)	MW2	Cable type interlock
	MB2	Pattern one of rod interlock
	MB3	Pattern two of rod interlock
	MB4	Pattern three of rod interlock
Current transformer for neutral line N connected externally	N1	1600AF L • M • H Controller
	N1	1600AF P Controller
	N2	2000AF
	N3	2500AF
	N4	4000AF
	N6	6300AF
Electrical mechanism for the indication of draw out socket's position	D1	
Separator plate between phases	B3	3P
	B4	4P
Electrical module for indication of ready-for-switching-on	RFS	
"Button" Locking device	L	
Counter	CM	
Communication function choice of accessories	S1	Components of draw-out socket communication module
	S2	Ready-for-switching-on signal
	S3	Under-voltage signal
	S4	Fault-trip signal
DC power supply module	PD1	24VDC
	PD2	110VDC
	PD3	220VDC
AC power supply module	PA1	230VAC
	PA2	400VAC
Automatic transfer switch (ATS) (included automatic controller, connector and 1.8m cable)	AS1	R type
	AS2	S type
	AS3	F type

■ Specifications

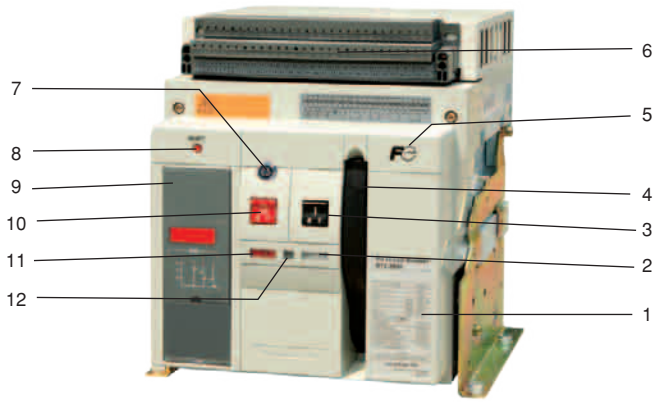
Frame size			1600A		2000A		2500A		4000A		6300A	
Basic type			BT2-1600 □		BT2-2000 □		BT2-2500 □		BT2-4000 □		BT2-6300 □	
No. of poles			3	4	3	4	3	4	3	4	3	4
Rated current (A)			200, 400, 630, 800, 1000, 1250, 1600		630, 800, 1000, 1250, 1600, 2000		1250, 1600, 2000, 2500		2000, 2500, 2900, 3200, 3600, 4000		4000, 5000, 6300	
Rated current of the neutral pole (IN)			100% In		100% In		100% In		100% In		100% In	
Rated insulation voltage (Ui)			1000		1000		1000		1000		1000	
Rated operational volage (Ue)			690		690		690		690		690	
Rated ultimate short-circuit breaking capacity (Icu kA, sym)	690VAC *1		40		50		50		75		85	
	400VAC		50		80		85		100		120	
Rated service short-circuit breaking capacity (Ics kA, sym)	690VAC *1		25		50		50		75		85	
	400VAC		50		80		85		100		120	
Rated making current (kA, peak)	690VAC *1		84		105		105		165		187	
	400VAC		105		176		187		220		264	
Rated short time withstand current (Icw) (kA, rms)	690VAC *1		25 (0.5s)		40 (1s)		50 (1s)		75 (1s)		85 (1s)	
	400VAC		42 (0.5s)		60 (1s)		65 (1s)		85 (1s)		100 (1s)	
Rated impulse withstand voltage (Uimp) (kV)			12		12		12		12		12	
Installations												
	Fixed	P	●	●	●	●	●	●	●	●	●	●
	Draw-out	X	●	●	●	●	●	●	●	●	●	●
Main circuit terminal connection												
	Fixed	Horizontal	●	●	●	●	●	●	●	●	●	●
		Vertical	●	●	●	●	–	–	●	●	●	●
	Draw-out	Horizontal	●	●	●	●	●	●	●	●	●	●
		Vertical	●	●	●	●	●	●	●	●	●	●
Dimensions												
	Fixed	W	254	324	362	457	362	457	414	527	782	1008
		H	320	320	395	395	395	395	395	395	395	395
		D	197	197	290	290	290	290	290	290	290	290
	Draw-out	W	248	318	347	442	347	442	401	514	767	993
		H	351.5	351.5	438	438	438	438	438	438	475.5	475.5
		D	297	297	390	390	390	390	395	395	395	395

Note: *1 Cannot be used for an IT distribution system.

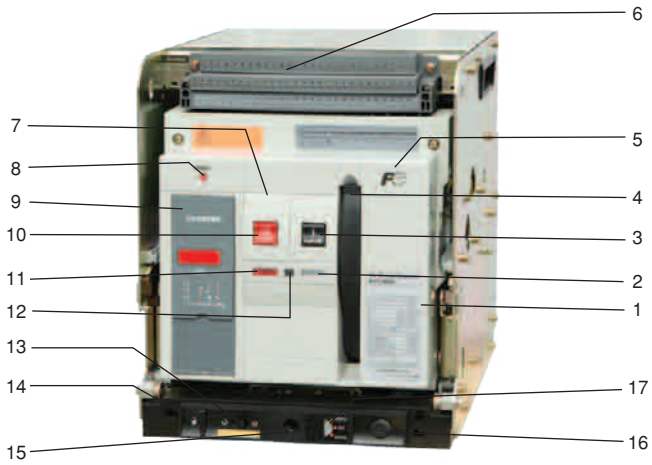
● Available

■ Appearance

• Fixed



• Draw-out



<Common>

1: Name plate
2: Indications of energy-storage and energy-release
3: ON button
4: Manual energy-storage handle
5: Brand
6: Terminals of sencondary circuit (fixed)
7: Off lock mechanism
8: Release indication and resetting button
9: Inteligent controller (OCR)
10: OFF button
11: Indications of "ON" and "OFF"
12: Indication of ready-for-switching-on ("OK")

<For Draw-out>

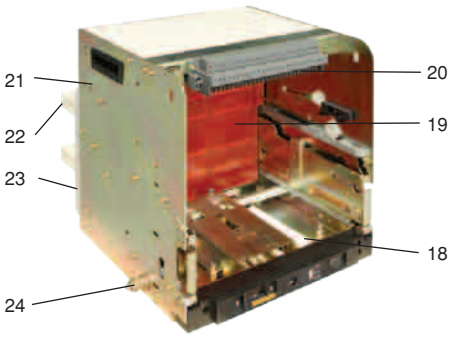
13: "Unlock button" of the three positions ("Separated", "test" and "connected") *1,2
14: Safety padlock mechanism
15: Racking shaft operating hole
16: Racking shaft storage hole
17: Indications of the three position ("Separated", "test" and "connected")

Note: *1 "Separated": Indicates that main circuit and secondary circuit are both in isolation."Test": Indicates that main circuit is in isolation and secondary circuit is in connection."Connected": Indicates that main circuit and secondary circuit are both in connection.

*2 The ACB can be automatically locked (racking shaft can not be turned at the point) when its main part is at the position of "separated","test" or "connected" by turning the racking shaft, and can be unlocked by pushing "unlock button" to the left side.

• Draw-out cradle

The cradle has the back plate for isolating the copper bar of the main circuit, which take the role of safety protection when the ACB is drawn out.



18: Installation hole
19: Safety back plate
20: Wiring terminals of secondary circuit
21: Side plate
22: Copper bar of the main cirucit
23: Draw-out socket
24: Earthing point at draw-out socket

■ Intelligent controller (OCR)

Selecting OCR's, it can be classified into six types

Type	L25	M25	M26	H26	P25	P26
	Option	Standard	Option	Option	Option	Option
Overcurrent protection (Long-time, Short-time, insantaneous)	●	●	●	●	●	●
Ground-fault protection	–	–	●	●	–	●
Load monitor function	–	○	○	○	○	○
Indication	Light Columnar	LED	LED	LED	LCD	LCD
Power, electric energy, power-factor, frequency indication	–	○	○	●	–	–
Alarm function (pre-trip alarm, overload alarm)	–	–	–	–	●	●
Test function	●	–	–	–	–	–
Contact Welding indication	●	●	●	●	●	●
Self-diagnosis function	–	●	●	●	●	●
MCR funciton	–	●	●	●	●	●
Fault-memory funciton	–	●	●	●	●	●
Current-imbalance indication	●	●	●	●	●	●
Thermo-analogue function	–	●	●	●	●	●
Harmonic analysis function	–	–	–	–	○	○
ZSI function	–	○	○	○	○	○
Communication function	–	–	–	●	○	○

Note: ● Reprensents fundamental functions, ○ Represents selective functions, – Represent no such functions

■ Function

Over-current protection

- The over-current protection is composed of phase and neutral line protection (Four pole breaker and three pole breaker with current transformer linking externally to neutral N) from over-current.
- The parameters of current and time of phase line over-current protection can be set by the company in terms of the requirements of users (can be set by customers themselves); the parameters of current and time of neutral line over-current protection will be set according to the setting of the phase line, all these mainly divided into the following two situations:

Three pole breaker with the neutral connected eaternally

- To type L25, M26, H26 intelligent controller, when ordering the goods the neutral line setting current customers should have to confirm the protecting data, it has two type of 50%In and 100%In.
- To type P25, P26 intelligent controller, the customers can setup into four types from menu:turn off, 50%In, 100%In, 200%In. When 200%In neutral line protecting (if it has a high triple frequency harmonic), the neutral line cross section should be double leg of a circuit cross section in the electrical power distribution system. But to BT2-6300 three circuit breaker, there is no neutral line protecting.

Four pole breaker

- To type L25, M25, M26, H26 intelligent controller, the customers should have to confirm the protecting data, it has two types of 50%In and 100%In.
- To type P25, P26 intelligent controller, the customers can setup into three types from menu:turn off, 50%In, 100%In.

Overload protection

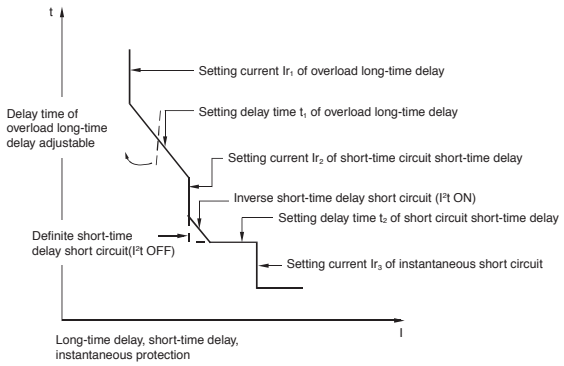
- Inverse long-time delay overload protection, and its setting current Ir1 can be adjusted.
- The delay time t1 of overload long-time delay can be adjusted.
- The long-time delay overload characteristic of the type P25, P26, the curves can be adjusted. There have common type (I2t), uncommon inverse-time type (It), high-voltage fuse concert type (I4t) can be adjusted, which can matching higher-up and lower-lever's overload protection'needs. The long-time delay overload characteristic ofthe type L25, M25, M26, H26, its running according to the common type (I2t) curves,current Ir1, time t1 can beadjusted.

Short-time short circuit protection (can be OFF)

- Inverse short-time delay short circuit protection (I2t ON), and its setting current Ir2 can be adjusted.
- Definite short-time delay short circuit protection (I2t OFF), and its setting current Ir2 can be adjusted.
- The delay time t2 of short circuit short-time delay can be adjusted.

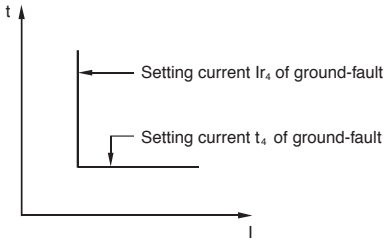
Instantaneous short circuit protection

- The setting current Ir3 of instantaneous short circuit (can be OFF) can be adjusted.

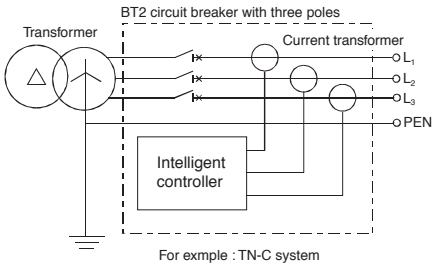

t
Setting current Ir1 of overload long-time delay
Setting delay time t1 of overload long-time delay
Delay time of overload long-time delay adjustable
Setting current Ir2 of short-time circuit short-time delay
Inverse short-time delay short circuit (I²t ON)
Setting delay time t2 of short circuit short-time delay
Definite short-time delay short circuit(I²t OFF)
Setting current Ir3 of instantaneous short circuit
I
Long-time delay, short-time delay, instantaneous protection

Ground-fault protection

- Definite ground-fault protection, and its setting current Ir4 can be adjusted
- Delay time t4 can be adjusted
- Alarm but not break after being off

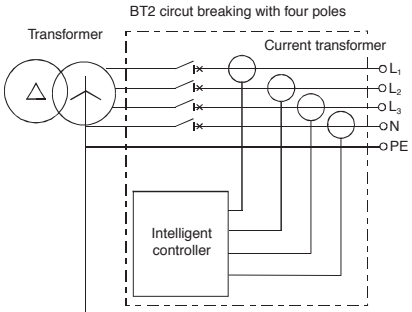


• TN-C, TN-C-S, or TN-S, power distribution system without additional current transformer of neutral



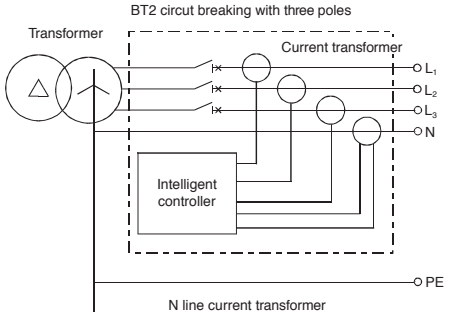
For exmple : TN-C system

• TN-S, power distribution system, 4 poles



For example: TN-S system

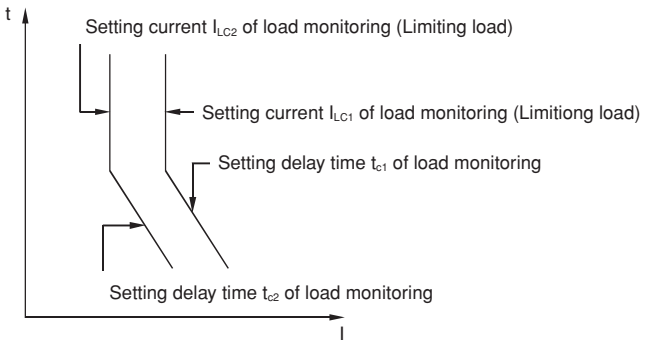
• TN-S, power distribution system, 3 poles



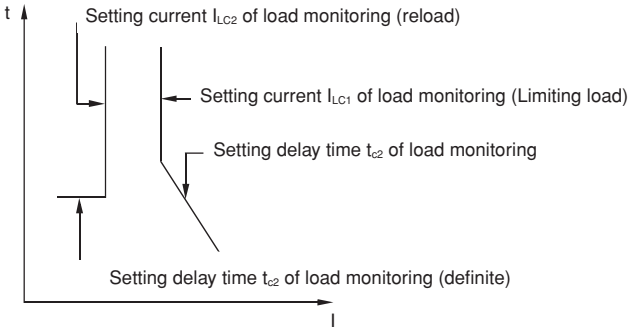
For example: TN-S system

Load monitoring function

- To monitor the down stream load so as to ensure power supply of main system
- There are two patterns of load monitoring from which users can choose one. The setting value of load-monitoring current are I_{LC1} and I_{LC2} , normally I_{LC1} is larger than or equal to I_{LC2}
- Inverse characteristic of load-monitoring is the same of inverse long-time delay overload characteristic.


t
Setting current I_{LC2} of load monitoring (Limiting load)
Setting current I_{LC1} of load monitoring (Limitiong load)
Setting delay time t_{c1} of load monitoring
Setting delay time t_{c2} of load monitoring
I

Acting characteristic of two kinds of ultimate setting load


t
Setting current I_{LC2} of load monitoring (reload)
Setting current I_{LC1} of load monitoring (Limiting load)
Setting delay time t_{c2} of load monitoring
Setting delay time t_{c2} of load monitoring (definite)
I

Acting characteristic of ultimate setting value of load and reload

- Pattern 1: Two circuits of down stream load can be controlled. When the operating current of the main circuit rises over the setting value of I_{LC1} and I_{LC2}, contact signal will be sent out after time durations of t_{C1} and t_{C2} repectively. Then this two circuits with monitored load are broken off by receiving the instructions from the intelligent controller.

- Pattern 2: Only one circuit with down stream load can be controlled. When the operating current of the main circuit rises over the setting value of I_{LC1}, contact signal will be sent out after time duration of t_{C1}, and this circuit is broken off by receiving the instructions from the intelligent controller. If the operating current of the main circuit decreases lower than the setting value of I_{LC2} after this circuit is broken off, the signal will be sent out again after time duration of t_{C2} for the open loading circuit to be closed (reloaded) and so the power supply of this circuit is restored.

- Load monitoring signals"(1)" and "(2)" corresponding to I_{LC1} and I_{LC2} respectively are transmitted into contact signals via the wiring terminals 13, 14 and 15, 16 of the secondary circuit. There will be LED indication at the time when signals are transmitted. (The load monitoring signals from the intelligent controller will be cut off in half second after the signal of contact closing is transmitted, and the capacity of contact is AC230V 5A)

■ Indication and measurement function

• For L25, M25, M26 and H26

Item	Type of OCR's	Display	Content	Indication and measurement range	Accuracy
Current	L25	Light columnar Indication	I_1, I_2, I_3, I_N	(0.1In to 2In) A	± 5%
	M25	LED	I_1, I_2, I_3, I_N , I_{max}		
	M26, H26		I_1, I_2, I_3, I_N , I_G, I_{max}		
Voltage	M25, M26 as optional H26 as standard	LED	U_{12}, U_{23}, U_{31}, U_{min}	30V to 690V	± 3%

• For P25 and P26

Item	Display	Content	Indication and measurement range	Accuracy
Current	LCD	I_1, I_2, I3, I_N	(0.1In to 2In) A	± 1.5%
		I_G	0.1In to 2000A	± 2.5%
Voltage		Line Voltage: U_{12}, U_{23}, U_{31} Phase Voltage: U_{1N}, U_{2N}, U_{3N}	30V to 690V	± 0.5%
Power		Three-phase active power Three-phase reactive power Three-phase apparent power	-120MW to +120MW -120Mvar to +120Mvar -120MVA to +120MVA	± 2.5%
Power-factor		Power-factor	-1.00 to +1,00	± 2.5%
Electric energy		Three-phase active electric energy Three-phase reactive electric energy Three-phase apparent electric energy	-10^{10}GWh to $+10^{10}$GWh -10^{10}Gvarh to $+10^{10}$Gvarh -10^{10}GVAh to $+10^{10}$GVAh	± 2.5%
Frequency		f	45 to 65Hz	± 0.1Hz
Fundamental current		I_{1-1}, I_{2-1}, I_{3-1}, I_{N-1}	(0.1In to 2In) A	± 1.5%
Fundamental line voltage		U_{12-1}, U_{23-1}, U_{31-1}	30V to 690V	± 0.5%
Fundamental phase voltage		U_{1N-1}, U_{2N-1}, U_{3N-1}		
Fundamental power		P1 Q1 S1	-120MW to +120MW -120Mvar to +120Mvar -120MVA to +120MVA	± 2.5%
Harmonic ratio		Current Voltage	0 to 1000%	± 5%
Total harmonic distortion (THD)		Current Voltage		

■ Alarm and fault functions

Over-current alarm	Type L25	Corresponding LED on the panel will be "ON"	Alarm and release indication lights will be on after the circuit breaker's being overloaded or released (yellow or red)
	Type M25		After the circuit breaker's being released by long-time delay overload, short-time delay short circuit and instantaneous short circuit, indication lights of corresponding alarm will be on.
	Type M26, H26		After the circuit breaker's being released by long-time delay overload, short-time delay short circuit, instantaneous short circuit and ground-fault, indication lights of corresponding alarm will be on.
	Type P25, P26		After the circuit breaker's being released by long-time delay overload, short-time delay short circuit and instantaneous short circuit, indication lights of corresponding alarm will be on.
Fault indication	Type L25	Corresponding LED on the panel will be "ON"	After the circuit breaker's being released by long-time delay overload, short-time short circuit and instantaneous short circuit, indication lights of corresponding fault type will be on.
	Type M25		After the circuit breaker's being released by long-time delay overload, short-time short circuit and instantaneous short circuit, indication lights of corresponding fault type will be on.
	Type M26, H26		After the circuit breaker's being released by long-time delay overload, short-time delay short circuit, instantaneous short circuit, instantaneous short circuit and ground-fault, indication lights of corresponding fault type will be on.
	Type P25, P26		After the circuit breaker's being released by long-time delay overload, short-time delay short circuit and instantaneous short circuit, indication lights of corresponding alarm will be on.
Indication of fault phase, current and time	Type M25, M26, H26	Indication	Indication of faulty phase, breaking value of fault current and breaking time
	Type P25, P26	Indication	It can indicate the latest ten times fault categories and occurrence time, faulty phase, breaking value of fault current and breaking time.

■ Test functions

Panel button	Type L25, M25, M26, H26, P25, P26	Release	Inspeciton of T-I characteristic of the OCR and the conditions of operating mechanism
	Type M25, M26, H26, P25, P26	Non-release	Inspeciton of T-I characteristic of the OCR

• Contact wearing indication (for M25, M26, H26, P25 and P26)
The intelligent controller has the function of contact wearing indication. Accordingly, the percentage of the equivalent to wearing times of main contact to electrical life-span times of the circuit breaker can be indicated by pushing the button of "wearing indication".

• Self-diagnosis function (for M25, M26, H26, P25 and P26)
When the microprocessor of the intelligent controller breaks down or the ambient temperature of the microprocessor rises over 80°C±5, alarm signals can be sent out immediately.

• MCR function
When the circuit breaker is on or the controller is initially electrified, the circuit breaker would trip instantly if short-time short circuit fault occurred.

• Fault-memory function (for M25, M26, H26, P25 and P26)
The types and phases of fault, value of faulty current and breaking time would be indicated on the intelligent controller if the circuit breaker broke off as a result of faults.

• Current disequilibrium display (selective function for P25 and P26)
The intelligent controller can sent out and display, when the three phases current disequilibrium level reached the setting value (20%-80%).

Note: the three phases current disequilibrium= $\frac{Imax\text{-}Imin}{Imax}\times100\%$

• Harmonic analysis function (for P25 and P26)
P25 or P26 intelligent controller with harmonic analysis function can measure fundamental current, fundamental line voltage, fundamental phase voltage, fundamental power, odd harmonic current ratio (HRIh) from the third to thirty-first, harmonic voltage ratio (HRUh), total harmonic distortion of current (THDi, thdi) and total harmonic distortion of voltage (THDu, thdu).

• Harmonic ratio (HR)
The ratio of RMS of hth harmonic component in the periodical alternating quantum to RMS of fundamental component (express by percent).

• Harmonic current ratio of hth expresses HRI_h.

$$HRI_h=\frac{I_h}{I_{1\text{-}1}}\times100\%$$

Note: I_h-harmonic current of hth of phase A (RMS)

• Harmonic voltage ratio of hth expresses HRU_h.

$$HRU_h=\frac{U_h}{U_{12\text{-}1}}\times100\%$$

Note: Uh -harmonic line voltage of hth between phase A and B.

• Total harmonic distortion (THD)
• The ratio of harmonic content in the periodical alternating quantum to RMS of fundamental component (THD)(express by percent).

$$THD_i=\frac{\sqrt{\sum_{h=2}^{\infty}I_h^2}}{I_{1\text{-}1}}\times100\%$$

$$THD_u=\frac{\sqrt{\sum_{h=2}^{\infty}U_h^2}}{U_{12\text{-}1}}\times100\%$$

Note: I_h-harmonic current of hth of phase A (RMS)
U_h-harmonic line voltage of hth between phase A and B (RMS)

• The ratio of harmonic component in the periodical alternating quantum to RMS of periodical alternating quantum(thd) (express by percent).

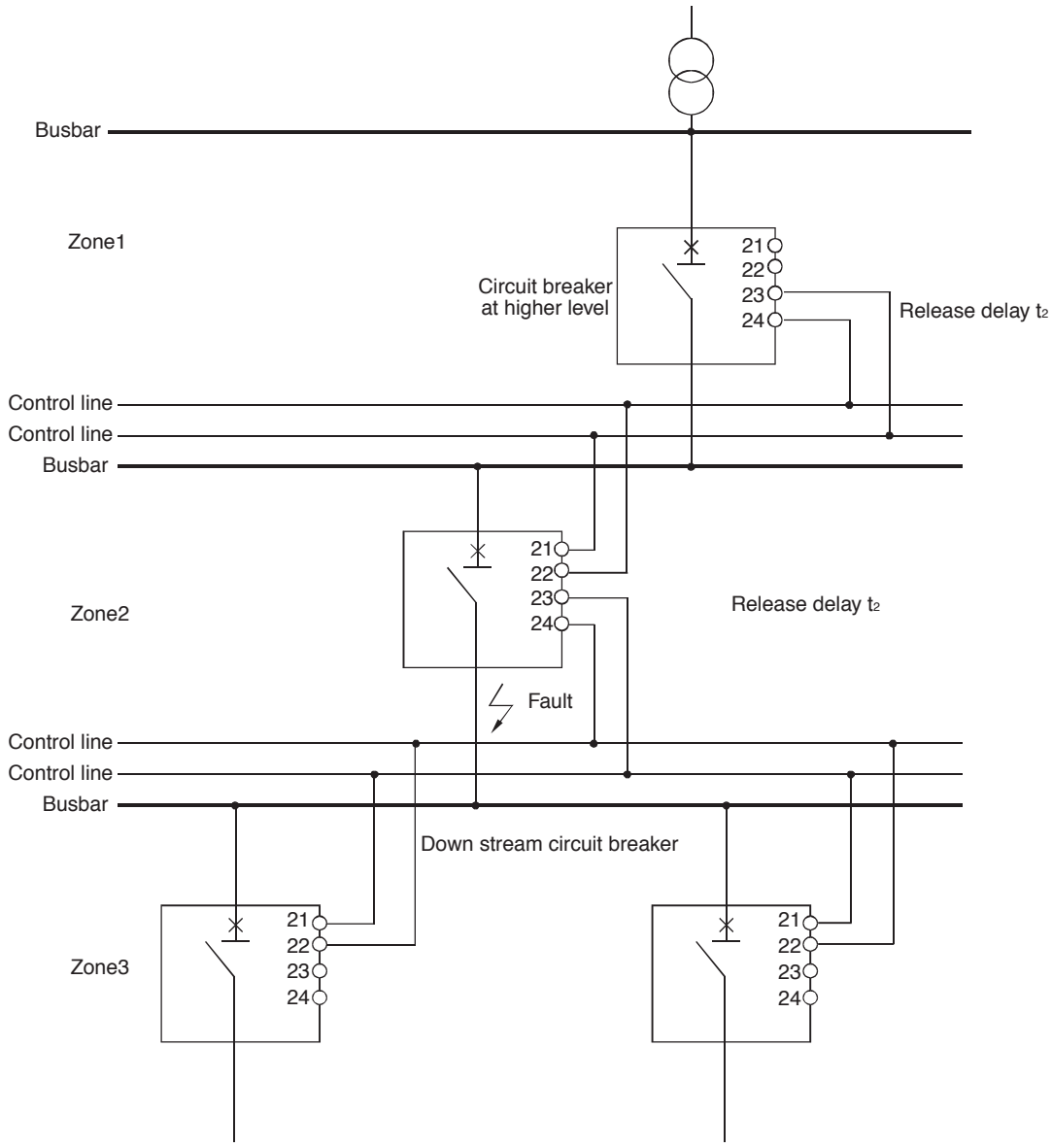
$$thd_i=\frac{\sqrt{\sum_{h=2}^{\infty}I_h^2}}{I_{1\text{-}1}}\times100\%$$

$$thd_u=\frac{\sqrt{\sum_{h=2}^{\infty}U_h^2}}{U_{12\text{-}1}}\times100\%$$

Ntoe: I_h-harmonic current of hth of phase A (RMS)
U_h-harmonic line voltage of hth between phase A and B (RMS)

■ Zone selective interlock

Zone selective interlock (ZSI function) (for M25, M26, H26, P25 and P26, optional)



Note: 21,22,23,24 serve as the wiring teminals of secondary circuit.

When pieces of circuit breakers are linked together up and down, zone selective interlock (ZSI) can ensure fully-selective protection of circuit breakers at higher or lower level so as to reduce the range of action by fault and the breaking time of circuit breakers. This function serves for short-time delay short circuit (I^2t OFF) and ground-fault protection of circuit breakers.

As the sketch shown above, control lines can interlock with pieces of circuit breakers.

After detecting the fault, the intelligent controller (zone 2) will send out a signal to circuit breakers (zone1) at higher level and check whether the signal of circuit breakers (zone 3) at lower level arrives. If circuit breakers at lower level send out a signal, the circuit breaker will be on at the time duration of release delay; if circuit breakers at lower level don't send out a signal, the circuit breaker will break off instantly no matter whether the release has the protection of delay.

Note: The end 23 and 24 should be shortcircuited.

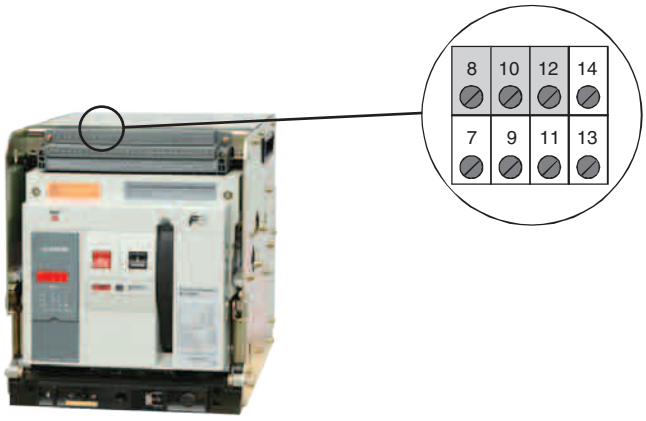
■ Communicative

To achieve the function of "four kinds of remote operation" at long distance by communication interface of the circuit breaker, namely, remote control, remote communication, remote adjustment and remote detection.

- Communication protocol : The application of Modbus-RTU mode
- Communication interface
- Standard interface: RS-485.
- Baud rate: 19200bps (in favour of 1200, 2400, 4800, 9600, 38400bps)
- Communication address:1-119.
- Byte format: First bit as start bit, eighth bit as data bit, second bit as stop bit, even check (in favour of non-check, odd check .)
- Network characteristic
- Twisted-pair shielded cables serve as communication lines.
- One line can link up 32 pieces of communicative circuit breakers at the same time (16 pieces of circuit breakers with components of draw-out socket communication module).
- Wiring distance is 1200m at maximum but the distance of communication can be extended by equipping with repeaters additionally.

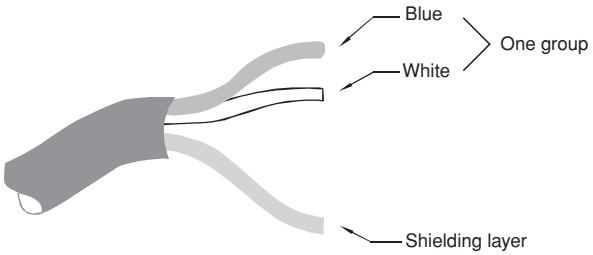
■ Communication data

- Real-time current, voltage fundamental current, fundamental voltage, power, power factor, electric energy, harmonic current or voltage ratio and total distortion of current or voltage.
- State data of circuit breakers such as alarm, fault, energy-storage, under-voltage, ready-for-switching-on, and the positions of switching-on and switching-off etc.
- The position of main body of the circuit breaker (components of communication module of draw-out socket for BT2 need to be purchased).
- The fetching and modification of the setting values of circuit breakers.
- Recorded data of fault last time.
- Outline data such as serial numbers and the type etc of circuit breakers.
- Long-distance operation if switching-on and switching-off.
- Circuit breakers can be switched on or off in the long-distance.
- Wiring terminals for communication.



Terminal	Signal	Function
8	DATA+(A+)	Receive/transmit data
10	DATA-(B-)	Receive/transmit data
12	SH	In connection with shielded layer of communication line

■ Communication cable



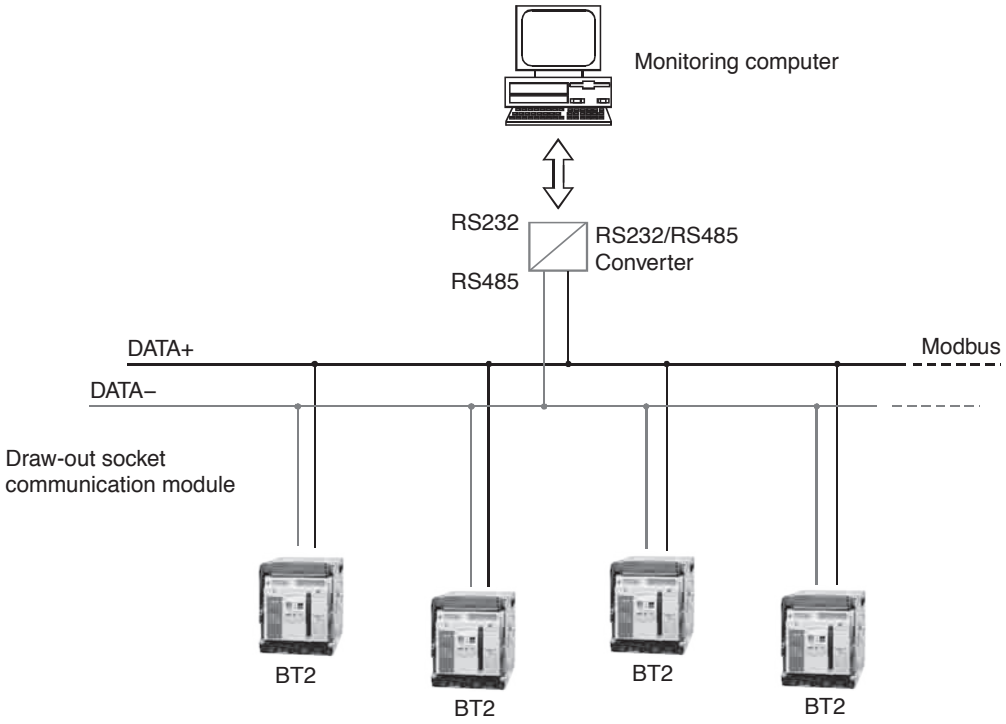
Standard twisted-pair shielded cable

Note: please use the type of communication cable with the shielding layer and approach to circuits with strong electricity should be avoided as far as possible when wiring in the cabinet.

Colour	Signal	Funation
Blue	DATA+	Receive/transmit data
White	DATA–	Receive/transmit data
Shielding layer	GND	Grounding

As the above diagram shows, a group of twisted-pair lines in the standard communication cable is employed as the communication line of 485 and the sheilding layer is grounded. The actual practice should be possibly different such as the application of the colour of the twisted-pair line. Users could define the ways of cable's usage by themselves but the definition of the signal of each line in the cable should be made clear in advance.

■ Linking diagram of communication system

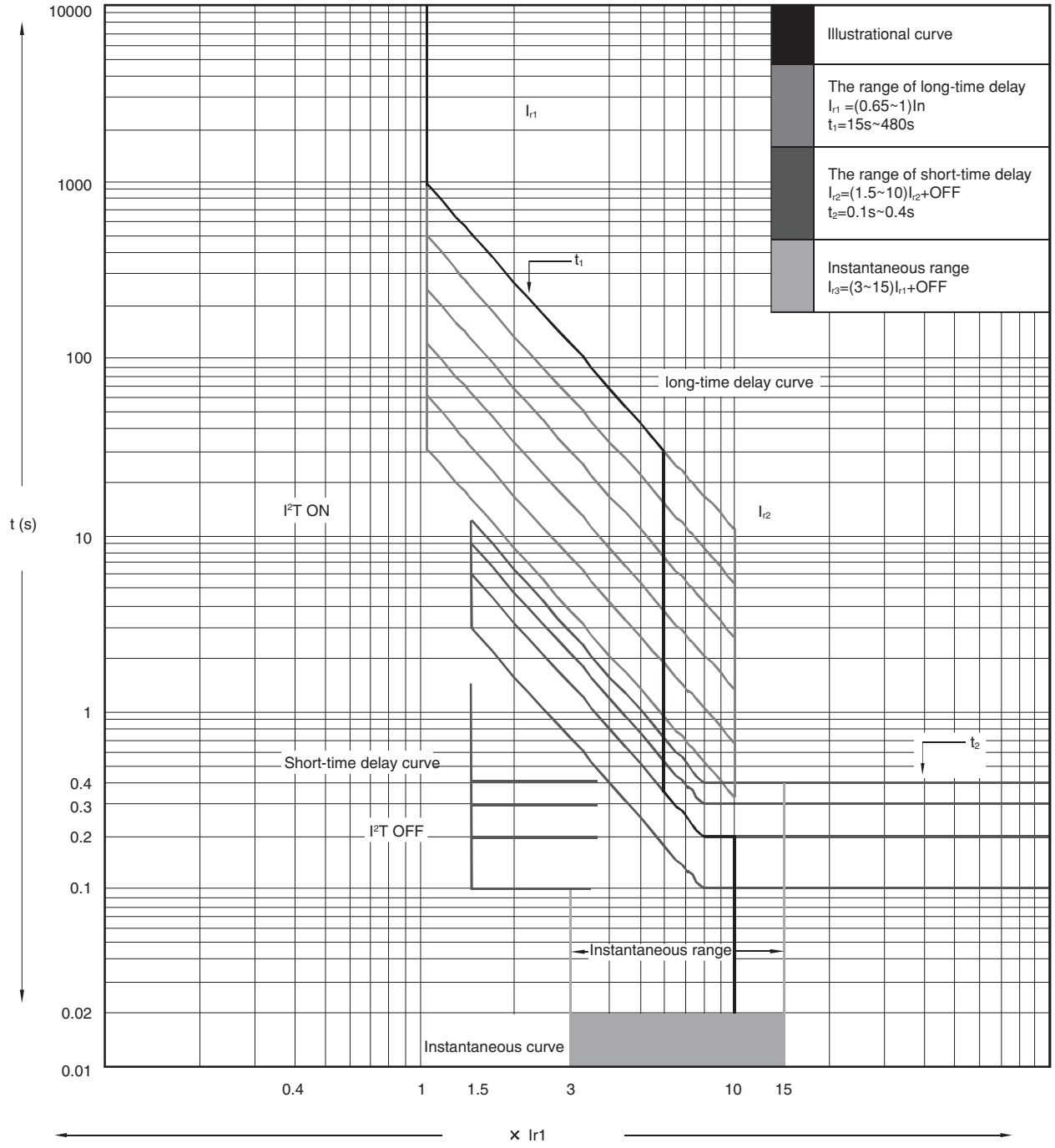


Note: As the accessory of selective purchase, the draw-out socket communication module should be selected into use when users need read the location of main body in the long distance by the choice of draw-out circuit breakers.

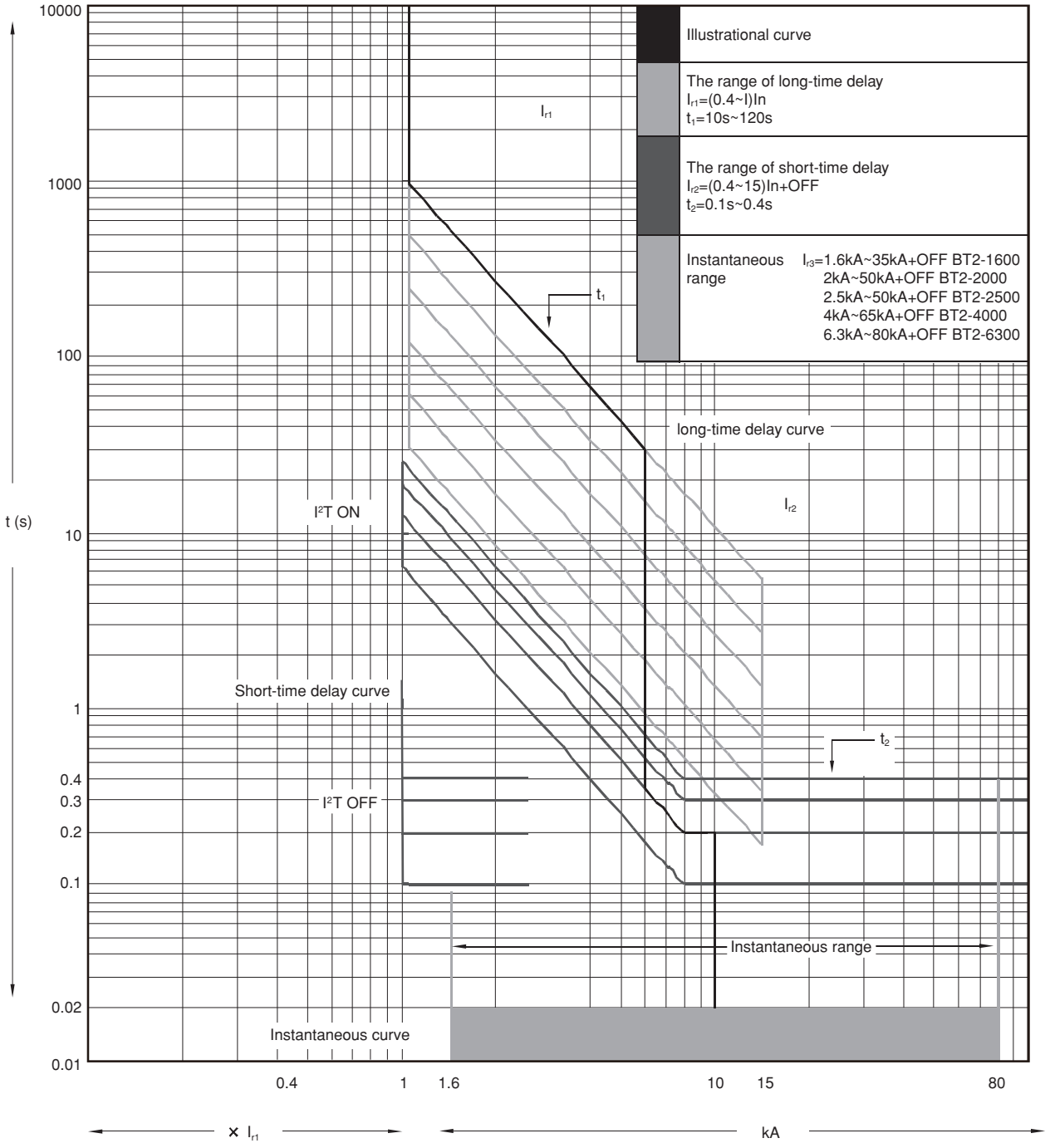
■ Characteristic curve of general I^2t

• BT2-1600~BT2-6300

T/I (time / current) curve of type L25 intelligent controllers (OCR)

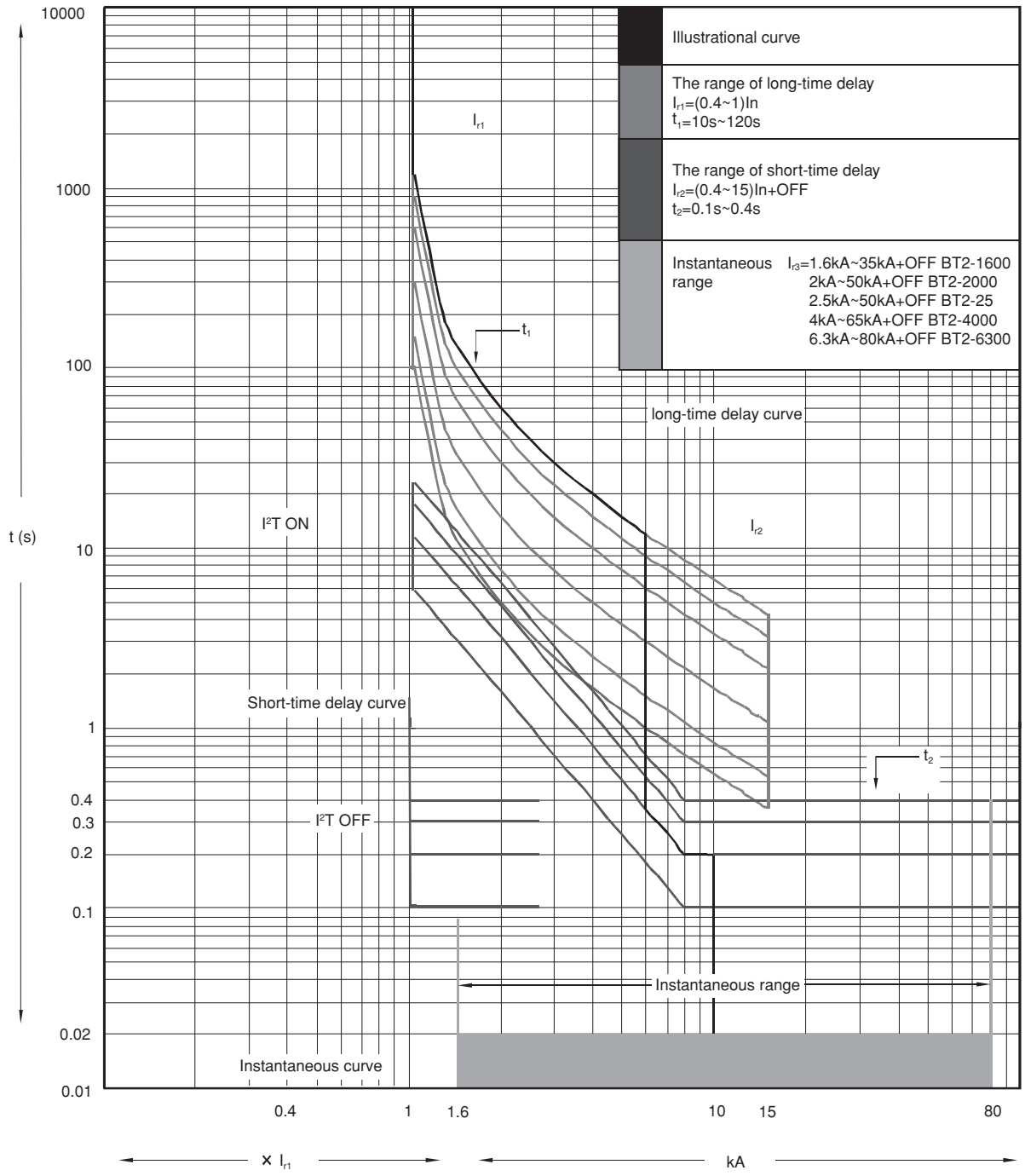


• T/I (time / current) curve of type M25, M26, H26, P25 and P26 intelligent controllers (OCR)



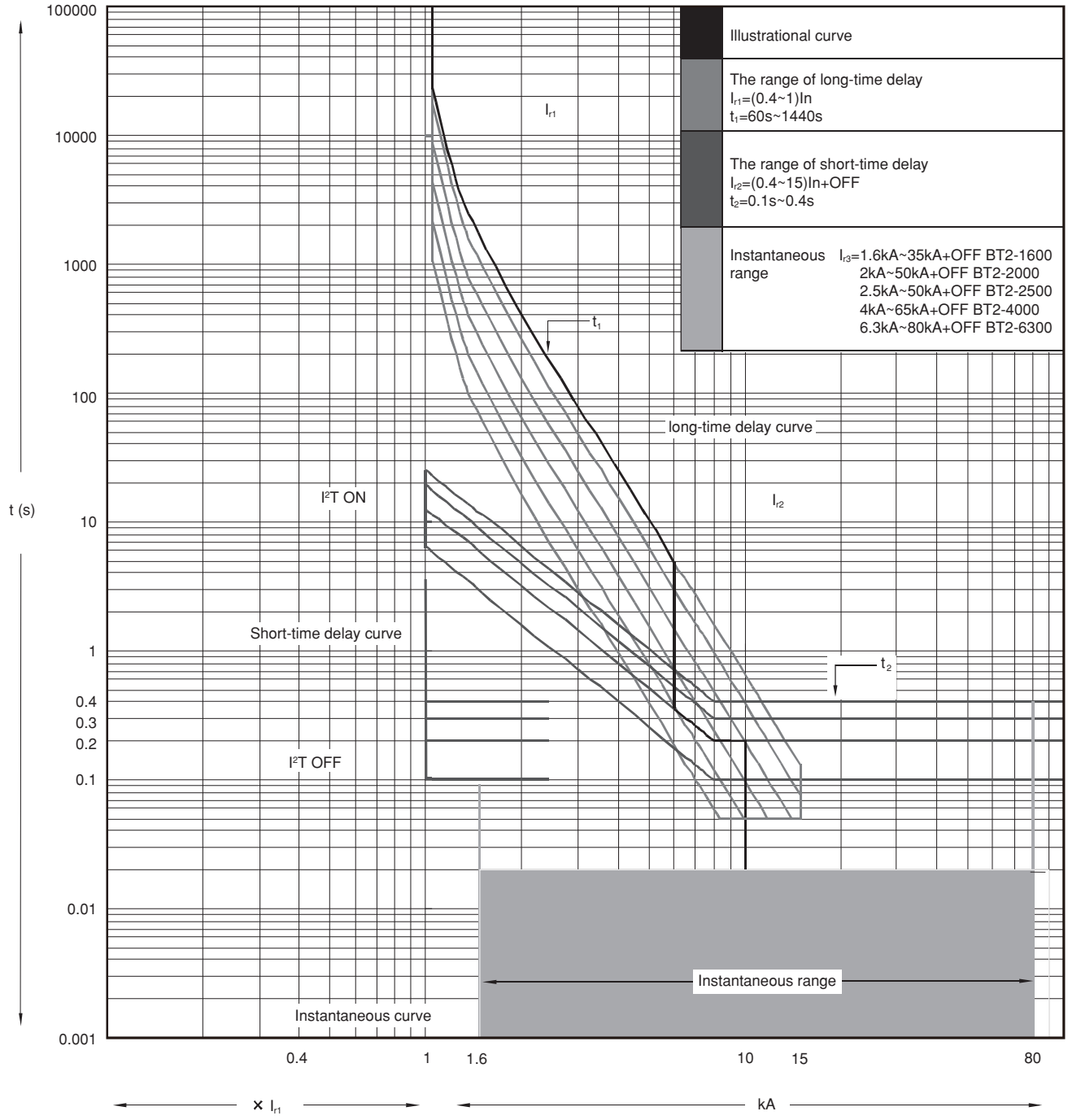
■ Characteristic curve of inverse time delay special It

• T/I (time / current) curve of type 25 and 26 intelligent controllers (OCR)

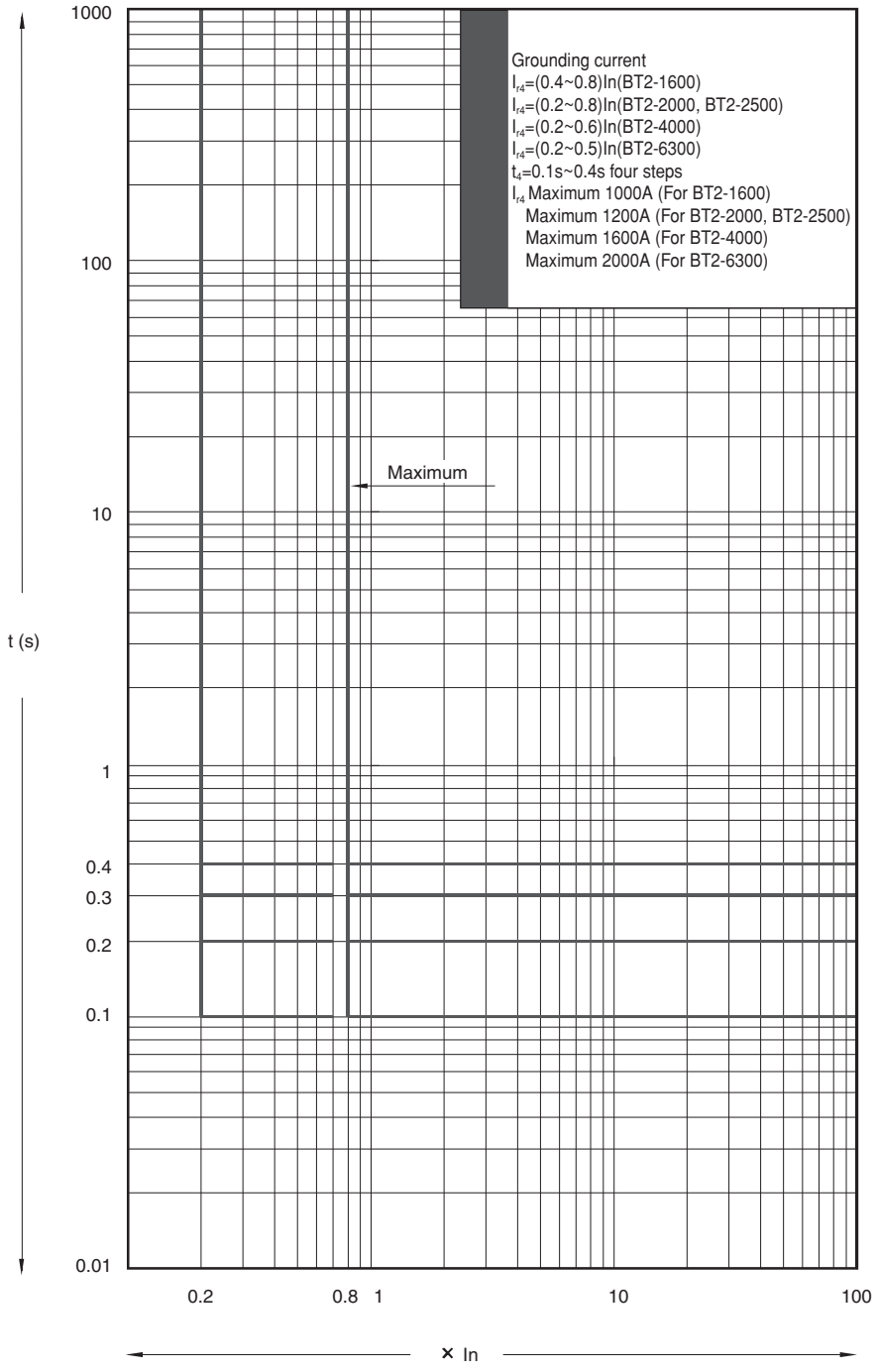


■ Characteristic curve of high-voltage fuse I^4t

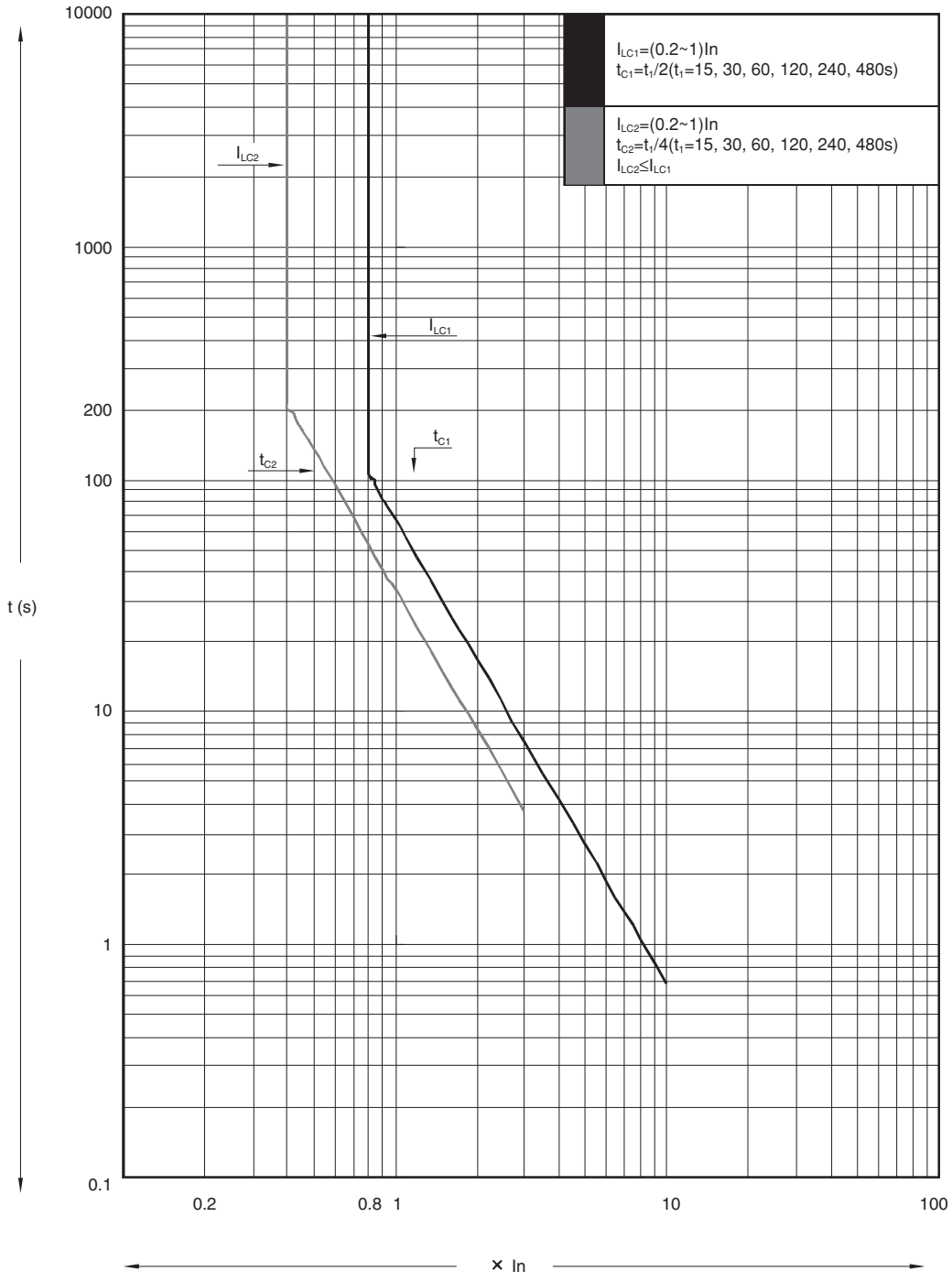
• T/I (time / current) curve of type 25 and 26 intelligent controllers (OCR)



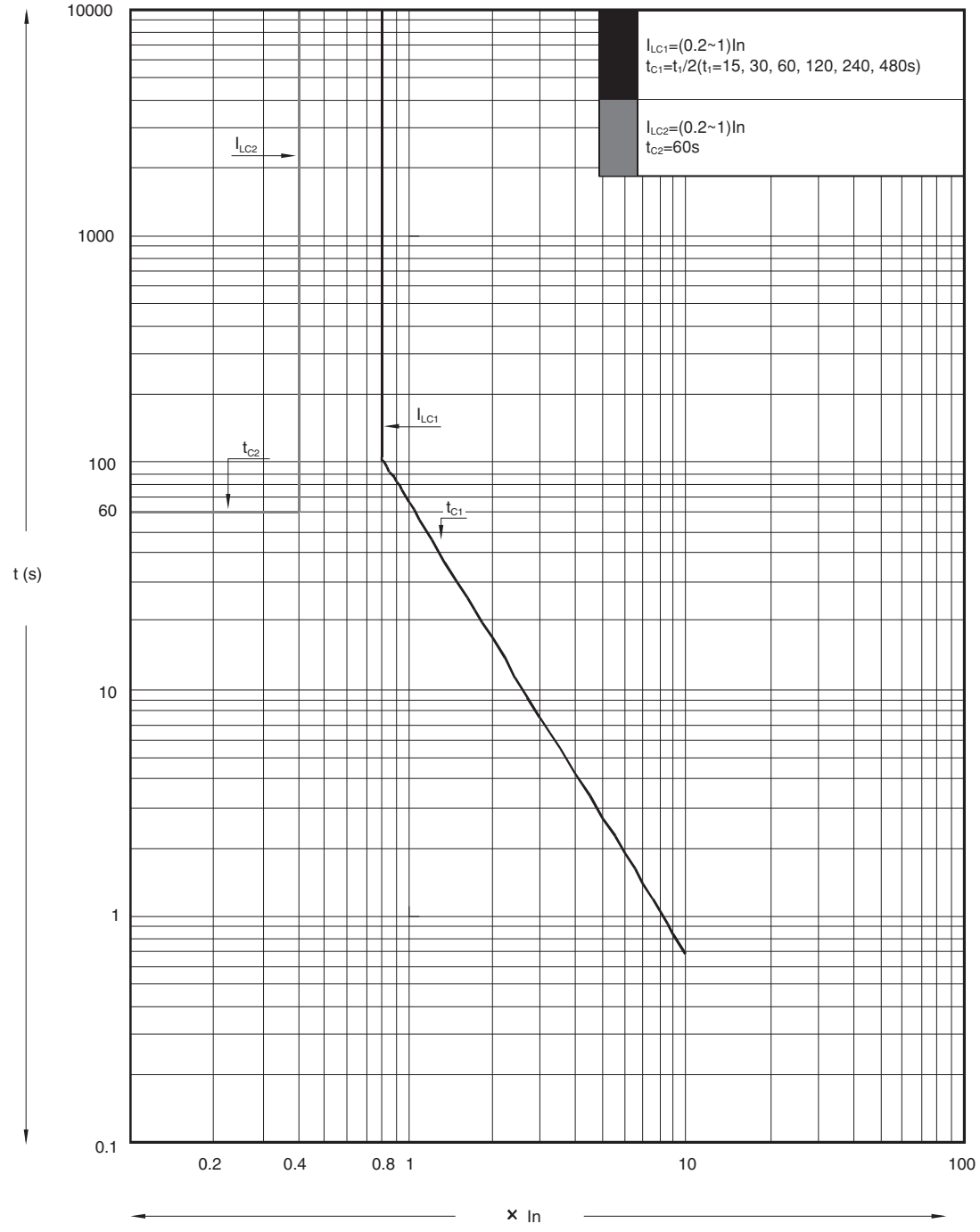
• T/I (time / current) curve of type M26, H26 and P26 intelligent controllers (OCR) for ground-fault protection



• T/I (time / current) curve of type M25, M26, H26, P25 and P26 intelligent controllers (OCR) for load-monitoring pattern one.



• T/I (time / current) curve of type M25, M26, H26, P25 and P26 intelligent controllers (OCR) for load-monitoring pattern two.



■ Accessories

● Supplied accessories

Following accessories are come with each ACB's as standard supplied.

• Shunt trip device

To break the ACB by remote control.

Rated voltage of control power supply	400VAC	230VAC	220VDC	110VDC
Operating voltage (V)	(0.7 to 1.1) Us			
Instantaneous current (A)	0.7	1.3	1.3	2.4
Breaking time (ms)	No more than 30			

• Charge Coil

After the ACB's ends up its energy storage, the closing electromagnet will make the energy storing spring to release its energy instantly, then to close the count ACB quickly.

Rated voltage of control power supply	400VAC	230VAC	220VDC	110VDC
Operating voltage (V)	(0.85 to 1.1) Us			
Instantaneous current (A)	0.7	1.3	1.3	2.4
Switching-on time (ms)	No more than 70			

• Drive unit

ACB has the functions of drive energy storage and automatic energy-restoring.

The energy storage can also be done manually.

Rated voltage of control power supply	400VAC	230VAC	220VDC	110VDC
Operating voltage (V)	(0.85 to 1.1) Us			
Power consumption	192VA		192W	
Energy storage time (s)	No more than 5			

• Auxiliary Switches

Rated voltage (V)		Conventional thermal current (A)	Rated capacity
AC	230	6	300VA
	400		
DC	220		60W
	110		

Note: Note: For the standard type of auxiliary switch, there are four groups of changeover contacts; for the special type of auxiliary switch, there are four pieces of normally-opened contacts (NO) and four pieces of normally-close contacts (NC), or 6 pieces of NO and 2 pieces of NC, or 2 pieces of NO and 6 pieces of NC.

• Safety padlock mechanism at the position of "separated"

When the draw-out circuit breaker indicates the position "of separated", the locking stick can be locked with padlock after being pulled out so that the rocker of the circuit breaker can not be turned to the position of "test" or "connected". Padlock should be provided by users themselves.

● Optional accessories

• Special power module

When the power voltage of BT2-1600 circuit breaker's intelligent control is AC230 or AC400V, it can be transformed into DC24 by this power module for power module for power supply of the OCR.

Note: The input of voltage to 1 and 2 terminals of the secondary circuit must be DC24V.
This module is installed by getting stuck into the standard slideway with 35mm in width inside the switchgear cabinet.

• DC24V power module

When the power voltage of BT2-1600 circuit breaker's intelligent control is DC24V, it can be transformed into DC24V by this power module for power supply of the OCR.
This module is installed by getting stuck into the standard slideway with 35mm in width inside the switchgear cabinet.

• DC power supply module

When power supply of the secondary circuit is DC220V, 110V, it should be transformed into DC24V by this module for power supply of the OCR.

• Under-voltage release

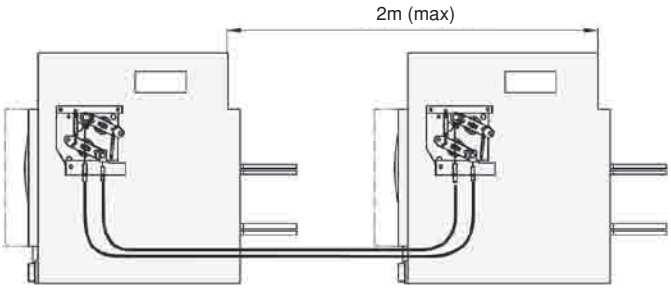
The under-voltage release consists of release coil and control unit.
The under-voltage release works in two ways: operating instantaneously and operating in time delay.
There are four specifications of time delay for the under-voltage time delay release: 0.5s, 1s, 2s and 3s. Users should consult with the manufacturer in the light of their order about special time-delay specifications as from 3s and above up to 9s. The time delay accurary is ±10%.
The Under-voltage release of BT2-1600 must be combined with the time-delay module which is installed by getting stuck into the standard slideway with 35mm in width.The module input terminals connect with main circuit,the output terminals connect with terminal 31, 32 of the breaker.

● Choice of communicate accessories

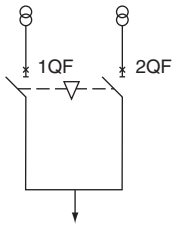
- Components of draw-out socket communication module
- The components of draw-out socket communication. module consists of the draw-out socket communication module outside of the circuit breaker and the draw-out socket communication parts inside of the circuit breaker. The draw-out socket communication parts are installed inside of the draw-out socket to provide the status signals of such three positions as “separated”, “test”and “connected”of the main body of the draw-out circuit breaker and the draw-out socket. The draw-out socket communication module, which can provide the function of reading the address of the circuit breaker and display the status indication of the main body and three positions of the draw-out socket etc, is installed by getting stuck into the standard slideway with 35mm in width inside the switchgear cabinet. The two parts of the draw-out socket communication module are connected with soft conducting lines.
- Ready-for-switching-on signal
  You can achieve the information through the uplever device that the circuit breaker is ready for switching-on.
- Under-voltage signal
  You can achieve the information through the upper device that the circuit breaker is tripping operation under-voltage.
- Fault-trip signal
  You can achieve the information through the upper device that the circuit breaker is tripping operation because of over loading short circuit or earth protection of the connection and devices.

● **Choice of mechanical interlock accessories**

• Two sets of circuit breakers put horizontally and interlocked with steel cable or stacked and interlocked with connecting rods
(the style of interlock between two sets of circuit breakers with connecting rods and aperture dimensions of their bases see the counterpart of three sets of circuit breakers)



Wiring diagram

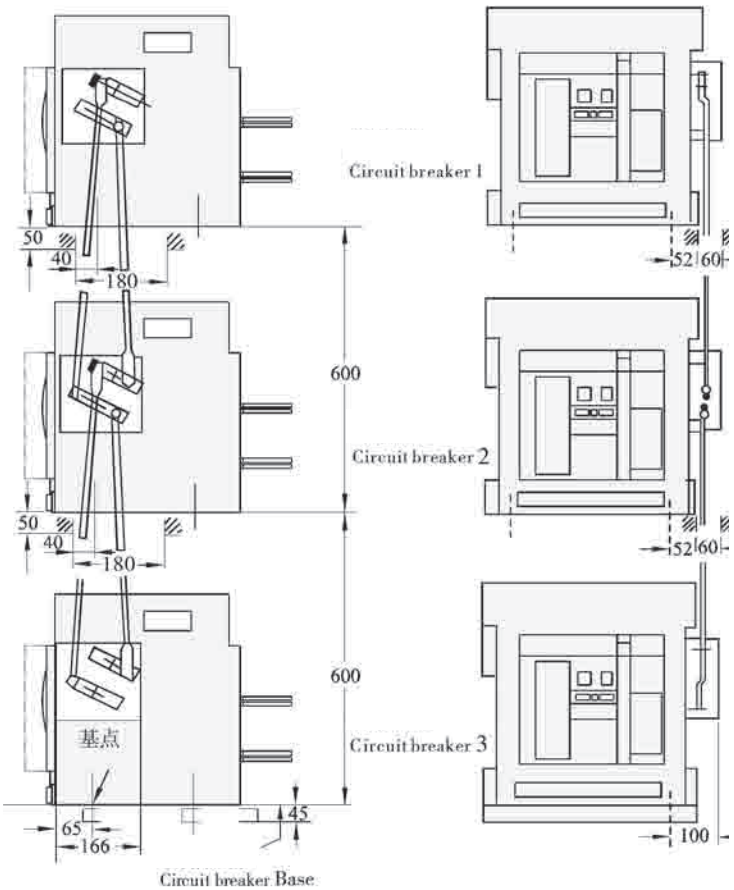


Possible operation pattern

1QF	2QF
0	0
0	1
1	0

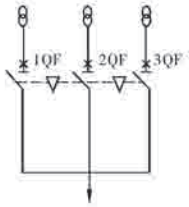
• Three sets of circuit breakers stacked and interlocked with connecting rods or three sets of circuit breakers put horizontally and interlocked with steel cable (without BT2-1600).

• **Stacked and interlocked**



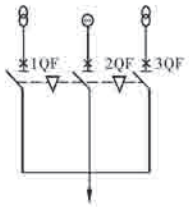
Wiring diagram Possible operation Pattern

Pattern one: three sets of power supply can only close one sets of circuit breaker



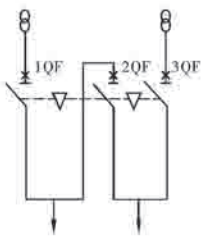
1QF	2QF	3QF
0	0	0
1	0	0
0	1	0
0	0	1

Pattern two: two sets of common power supply plus one sets of standly power supply



1QF	2QF	3QF
0	0	0
1	0	0
0	1	0
1	0	1
0	0	1

Pattern three: two sets of power supply plus a piece of coupling busbar



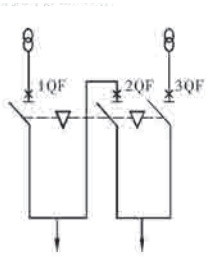
1QF	2QF	3QF
0	0	0
1	0	0
0	1	0
0	0	1
1	1	0
0	1	1
1	0	1

• Steel cable interlocked

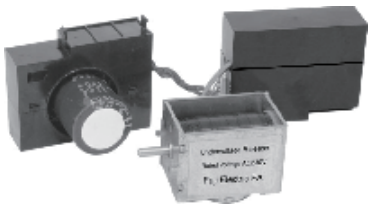
The style of interlock of three circuit breakers see the style of interlock between two sets of circuit breakers. The maximal distance of two circuit breakers is 2m.

Wiring diagram Possible operation pattern

Pattern three:Two sets of power supply plus a piece of coupling busbar



1QF	2QF	3QF
0	0	0
1	0	0
0	1	0
0	0	1
1	1	0
0	1	1
1	0	1



BT2-2000 and above

● Electrical mechanism for the indication of draw-out socket's position

- When the main body of the draw-out circuit breaker and the draw-out socket are at the position of “separated”, “test” and “connected” respectively, three electrical mechanisms for the indication of draw-out socket's location can output the electrical signals corresponding with three positions above respectively. These mechanisms are installed inside the draw-out socket.
- Characteristics

Rated working voltage	Ue (V)	230
Convertional thermal current	Ith (A)	10
Rated working current	Ie (A)	1.5

● Electrical module for indication of ready-for-switching-on

- This electrical module indicates that the ciruit breaker is ready for switching-on.
- Characteristics

Rated working voltage	Ue (V)	230
Convertional thermal current	Ith (A)	10
Rated working current	Ie (A)	1.5

● Current transformer with neutral line N connected externally

- This current transformer, which is used together with circuit breakers with three poles in the power distribution system of TN-S, installed in the neutral line N with 2m at maximum far from the installation point.
- Characteristics

Rated working voltage	Ue (V)	AC400	AC230
Acting voltage	(V)	(0.35~0.7) Us	
Reliable switching voltage	(V)	(0.85~1.1) Us	
Reliable switching resistant voltage	(V)	≤0.35Us	
Power consumption		12VA	

Note: In the electrified metworks where thunder and rain often happens or whose power supply is not stable, under-voltage release with time delay is highly recommended to protect the circuit breader from releasing due to transient voltage-lowering. Generally, delay time, which is selective by users , is 0.5s, 1s, 2s and 3s.

"Break"lock mechanism

- "Break"lock mechanism
- "Break"lock mechanism can lock the "OFF" button of the circuit breaker on the pressed position. As a result, the circuit breaker can not be switched on.
- After this lock mechanism was chosen by users, the manufacturer would provide lock and key.
- One set of circuit breaker is outfitted with one lock and one key.
- Two sets of circuit breakers are outfitted with two same locks and one key.
- Three sets of circuit breakers are outfitted with three same locks and two keys.

- "Button"locking device
- When installed "Button"locking device, it can prevented somebody from operating button of switching-on or switching off by mistake.
- Padlock should be provided by users themselves.

- Counter
- The counter can count mechanical operation times accumulatively, which makes users be clear at a glance.

- Separator plate between phases
- Separator plates between phases which strengthen insulation between bus-bars are optional and will be equipped as needed by users.

■ Power consumption and derating coefficient

• Power consumption (Environment temperature +40°C)
Power consumption is the overall consumption measured under with the circuit breaker is electrified with current below frame current.

Type	Three poles/four poles (W)	
	Fixed type	Draw-out type
BT2-1600	152	408
BT2-2000	203.6	382.8
BT2-2500	356.8	823.4
BT2-4000	648.96	897.6
BT2-6300	1050.1	1200.2

• Derating coefficient
The following table shows continual current-loading capacity of circuit breakers at different ambient environment temperature and under the conditions of the satisfaction of conventional heating in IEC60947-2

Ambient Environment temperature		+40°C	+45°C	+50°C	+55°C	+60°C
Continual current-loading capacity	Inm=1600A	1Inm	0.99Inm	0.96Inm	0.90Inm	0.87Inm
	Inm=2000A	1Inm	0.97Inm	0.91Inm	0.87Inm	0.82Inm
	Inm=2500A	1Inm	0.96Inm	0.90Inm	0.86Inm	0.80Inm
	Inm=4000A	1Inm	0.95Inm	0.89Inm	0.85Inm	0.78Inm
	Inm=6300A	1Inm	0.93Inm	0.87Inm	0.82Inm	0.75Inm

■ Derating for high-elevation

If elevation exceeds work environment 2000m, electric property of circuit breaker can correct according to following table:

elevation (m)	2000	3000	4000	5000
Power-frequency withstand voltage (V)	3500	3150	2500	2000
Correction factor of operational current	1	0.93	0.88	0.82
Correction factor of short-circuit breaking capacity	1	0.83	0.71	0.63

■ **Reference table of main circuit wiring copper bar for draw-out circuit breaders**

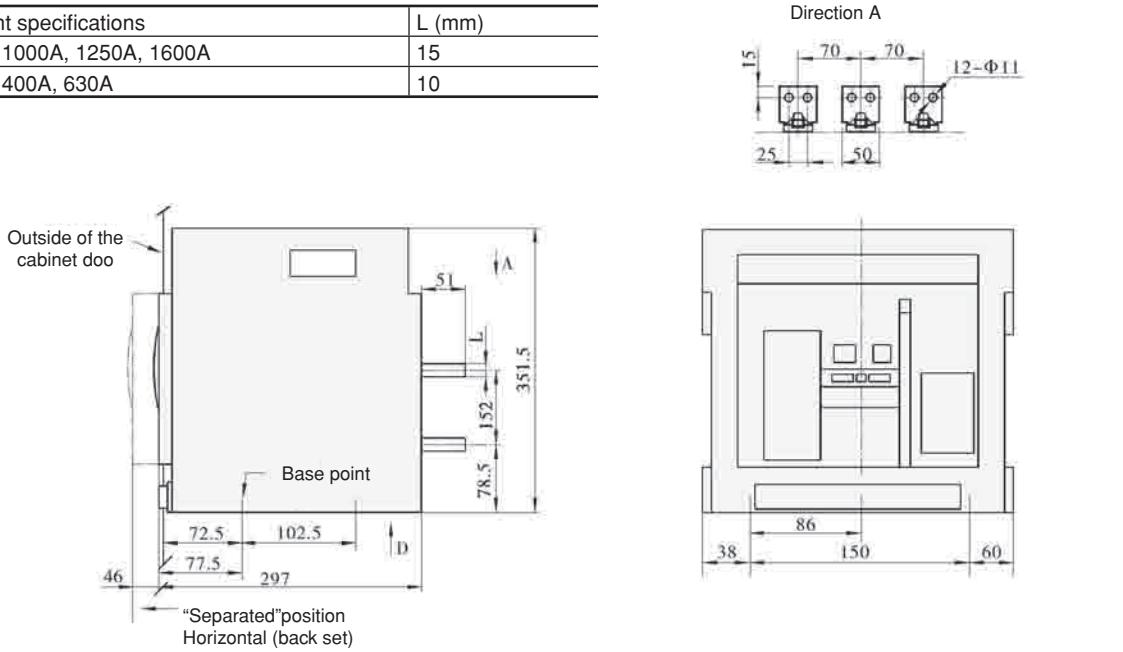
Rated frame current (A)	Rated current (A)	Specifications of copper bars	
		Number	Size (mm×mm)
1600	200	1	20×5
	400	1	50×5
	630	2	40×5
	800	2	50×5
	1000	3	40×5
	1250	4	40×5
	1600	2	50×10
2000	630	2	50×5
	800	2	60×5
	1000	2	60×5
	1250	3	60×5
	1600	2	60×10
	2000	3	60×10
2500	1250	3	60×5
	1600	2	60×10
	2000	3	60×10
	2500	4	60×10
4000	2000	3	100×5
	2500	4	100×5
	2900	3	100×10
	3200	4	100×10
	3600	4	100×10
	4000	5	100×10
6300	4000	5	100×10
	5000	6	100×10
	6300	8	100×10

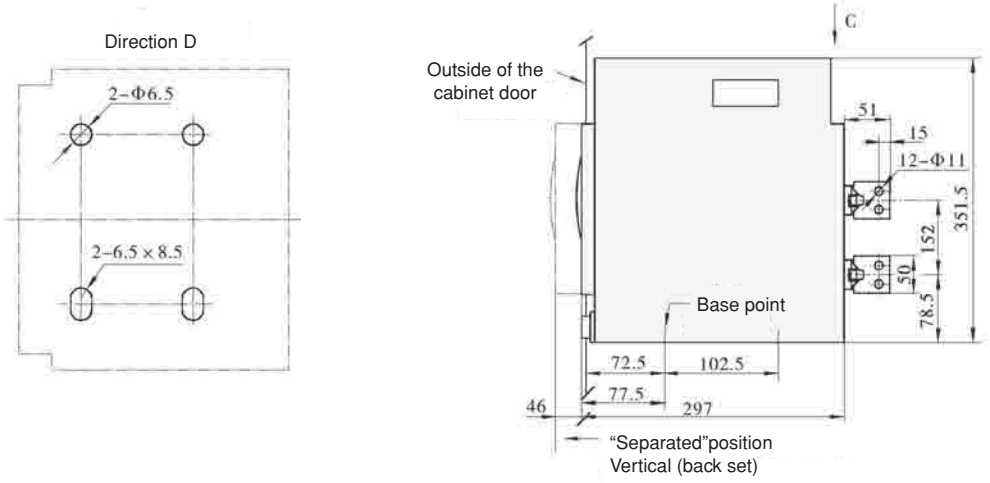
The specifications of copper bars in the above table are introduced under which the circuit breakers by open installation are at maximum ambient environment temperature of 40°C and satisfy conventional heating in IEC60947-2.

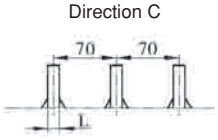
■ Dimensions and mounting, mm

● BT2-1600 Air Circuit Breaker with three poles (draw-out type)

Current specifications	L (mm)
800A, 1000A, 1250A, 1600A	15
200A, 400A, 630A	10



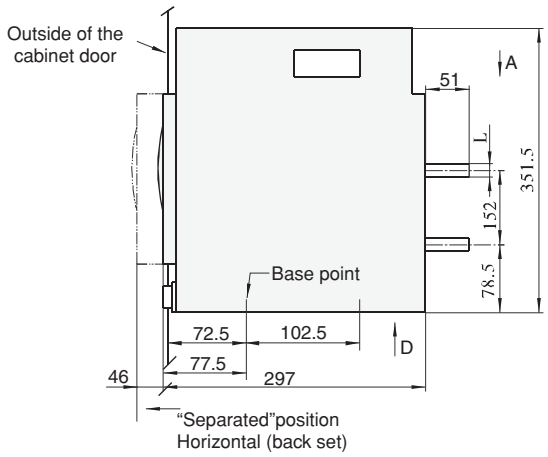


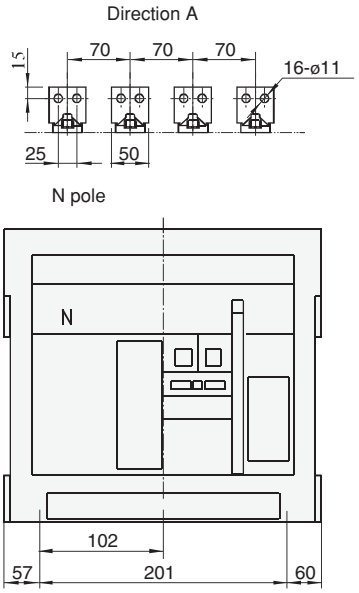


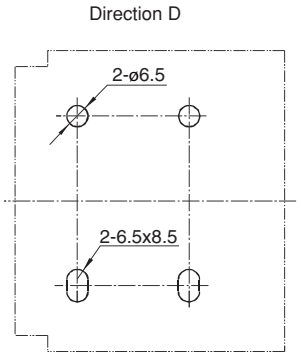
■ Dimensions and mounting, mm

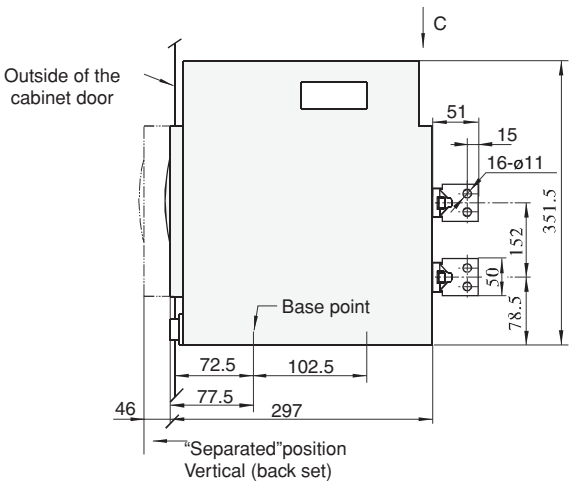
● BT2-1600 Air Circuit Breaker with four poles (draw-out type)

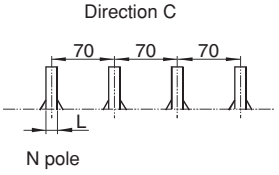
Current specifications	L (mm)
800A, 1000A, 1250A, 1600A	15
200A, 400A, 630A	10







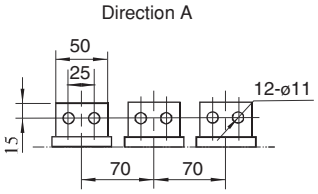


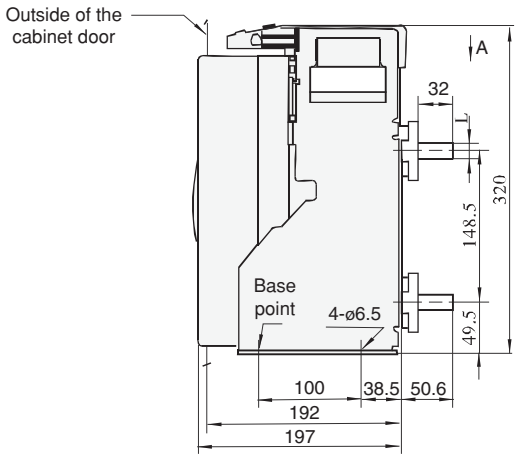


■ Dimensions and mounting, mm

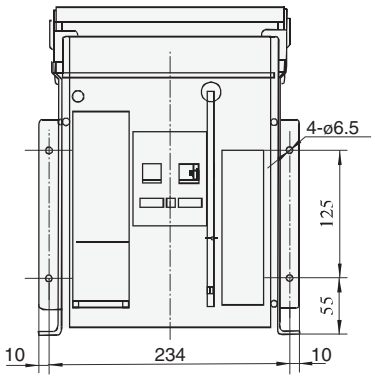
● BT2-1600 Air Circuit Breaker with three poles (fixed type)

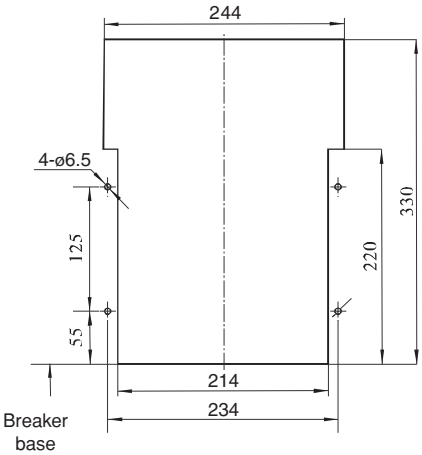
Current specifications	L (mm)
800A, 1000A, 1250A, 1600A	15
200A, 400A, 630A	10



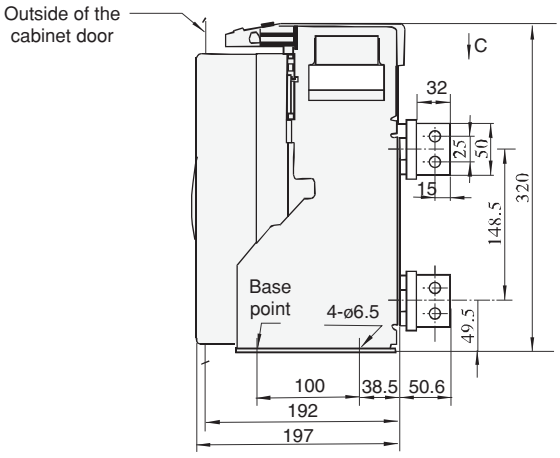


Horizontal (back set)

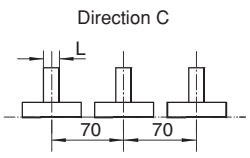




Aperture dimensions of the back plate at the time of hanging type installation



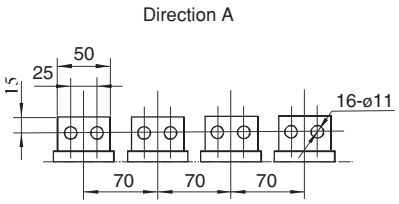
Vertical (back set)

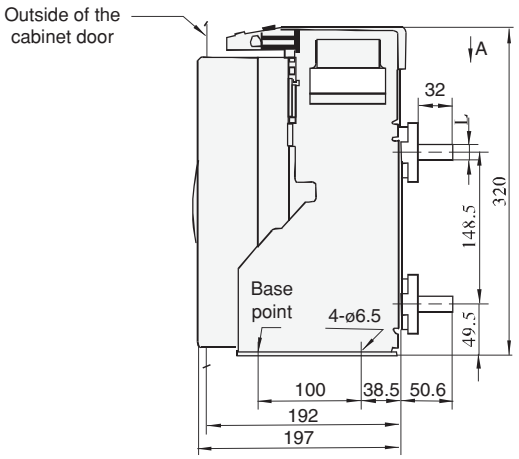


■ Dimensions and mounting, mm

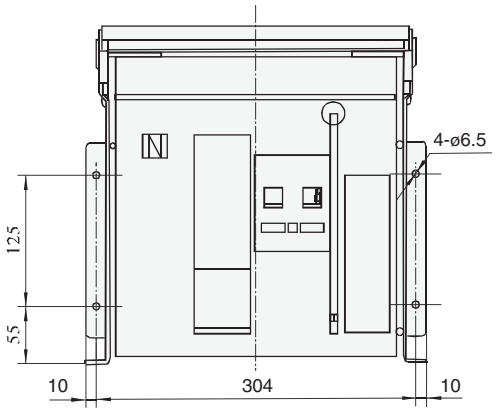
● BT2-1600 Air Circuit Breaker with four poles (fixed type)

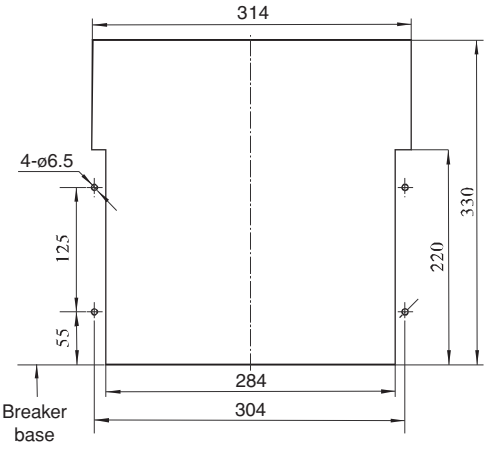
Current specifications	L (mm)
800A, 1000A, 1250A, 1600A	15
200A, 400A, 630A	10



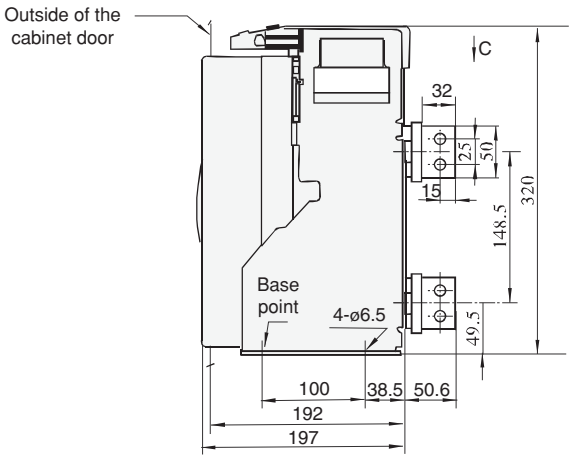


Horizontal (back set)

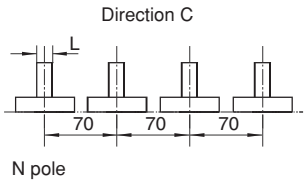




Aperture dimensions of the back plate at the time of hanging type installation



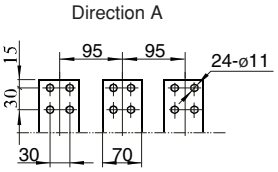
Vertical (back set)

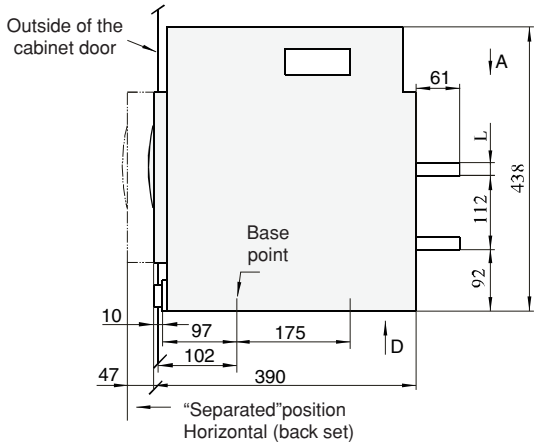


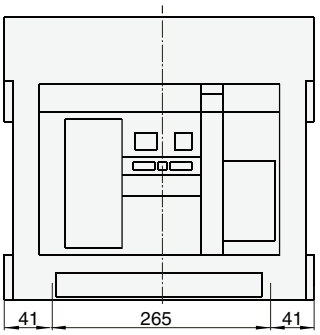
■ Dimensions and mounting, mm

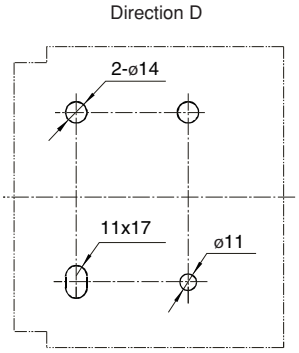
● BT2-2000 Air Circuit Breaker with three poles (draw-out type)

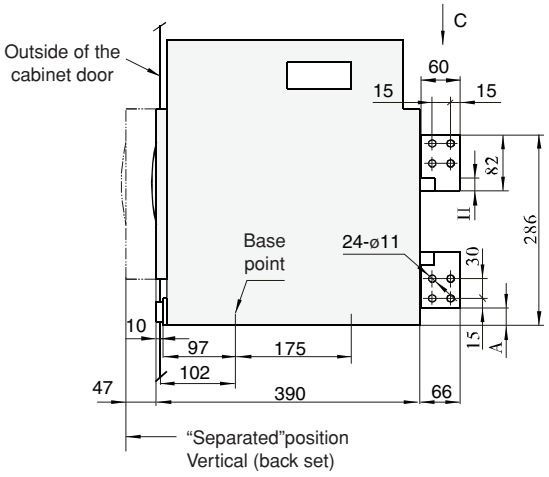
Current specifications	L (mm)	H (mm)	A (mm)
2000A	20	20	30
630A, 800A, 1000A, 1250A, 1600A	15	15	25

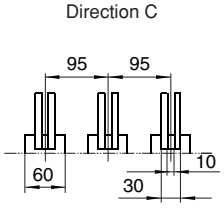








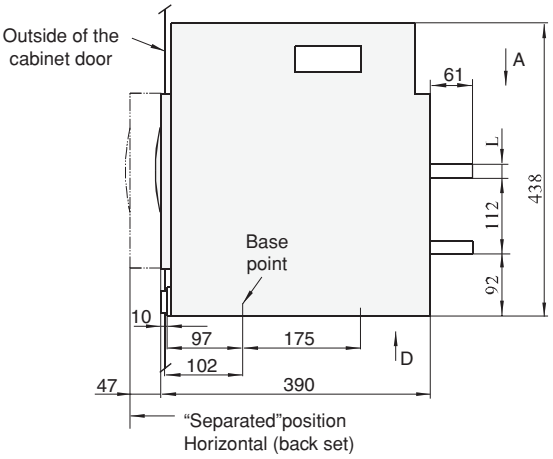


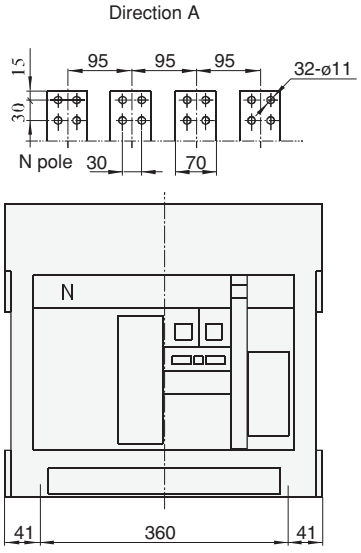


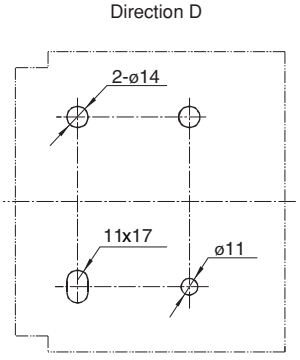
■ **Dimensions and mounting, mm**

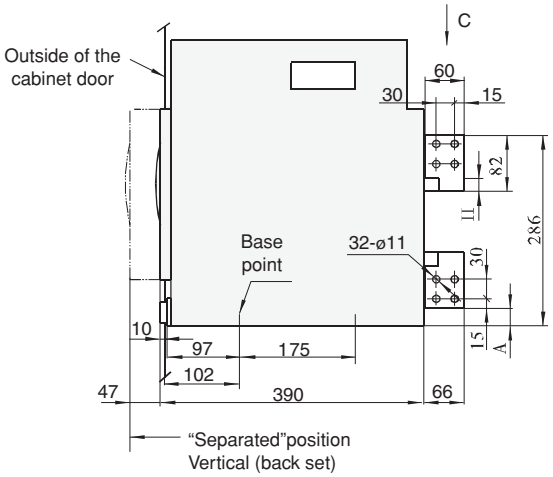
● **BT2-2000 Air Circuit Breaker with four poles (draw-out type)**

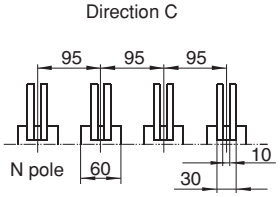
Current specifications	L (mm)	H (mm)	A (mm)
2000A	20	20	30
630A, 800A, 1000A, 1250A, 1600A	15	15	25







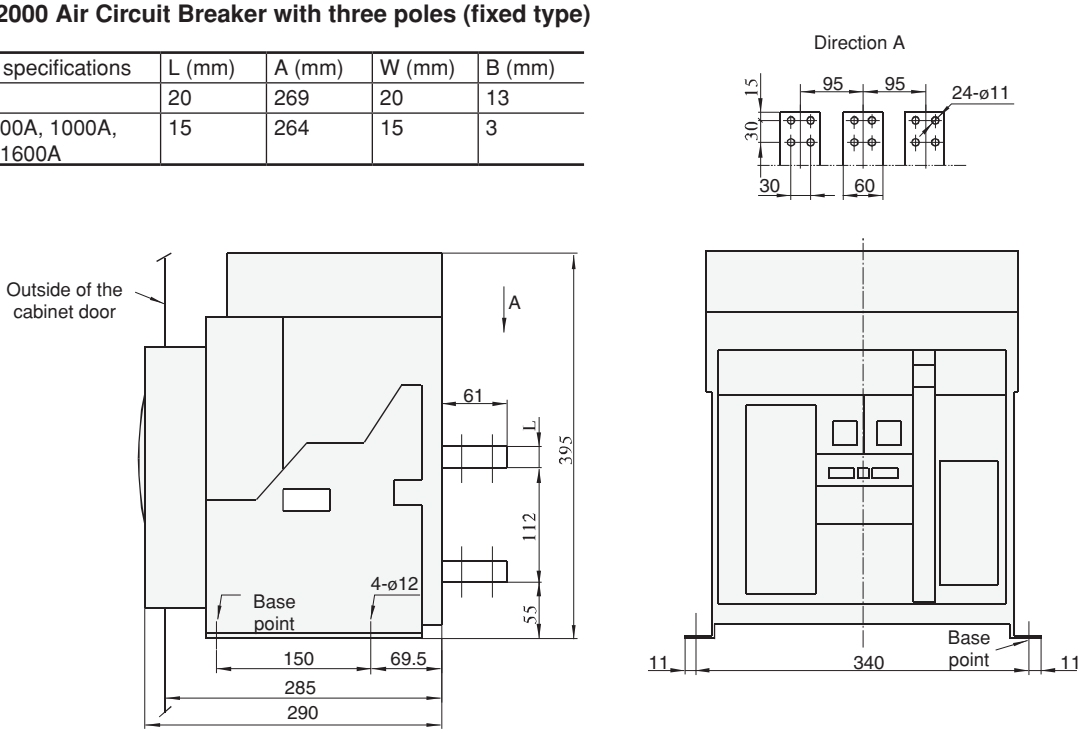




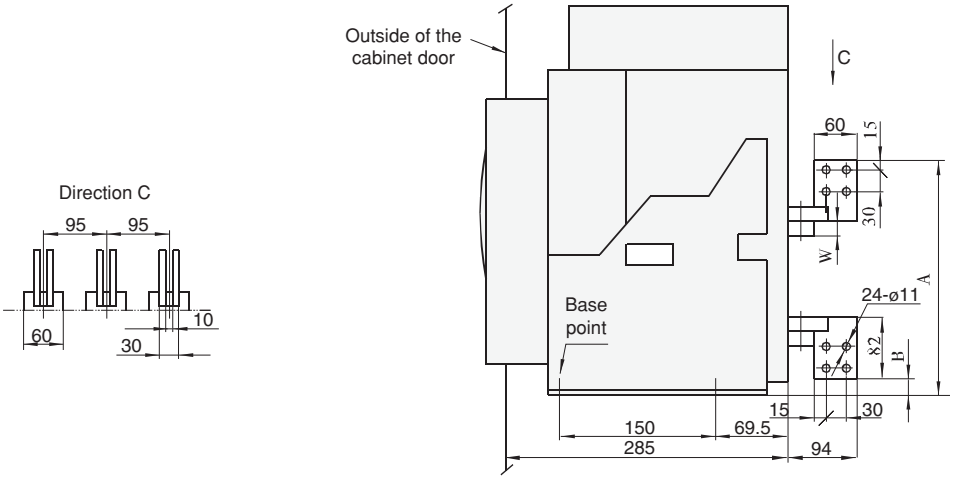
■ Dimensions and mounting, mm

● BT2-2000 Air Circuit Breaker with three poles (fixed type)

Current specifications	L (mm)	A (mm)	W (mm)	B (mm)
2000A	20	269	20	13
630A, 800A, 1000A, 1250A, 1600A	15	264	15	3



Horizontal (back set)

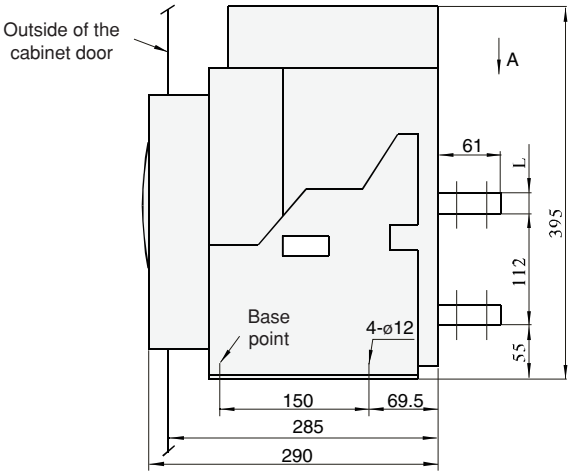


Vertical (back set)

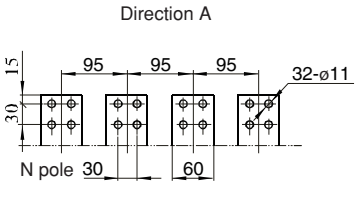
■ **Dimensions and mounting, mm**

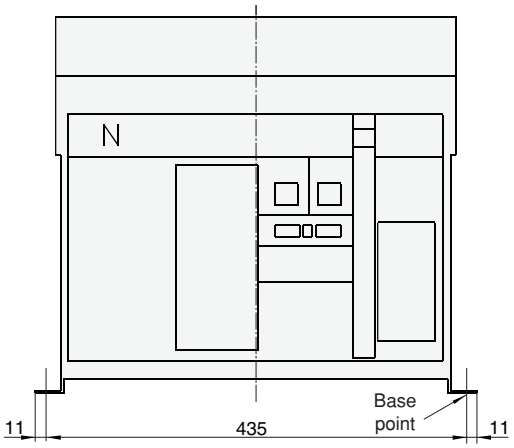
● **BT2-2000 Air Circuit Breaker with four poles (fixed type)**

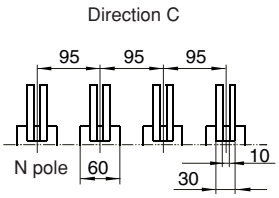
Current specifications	L (mm)	A (mm)	W (mm)	B (mm)
2000A	20	269	20	13
630A, 800A, 1000A, 1250A, 1600A	15	264	15	3

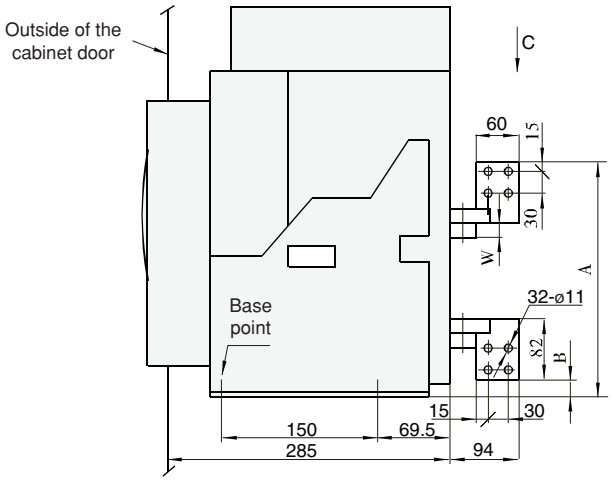


Horizontal (back set)







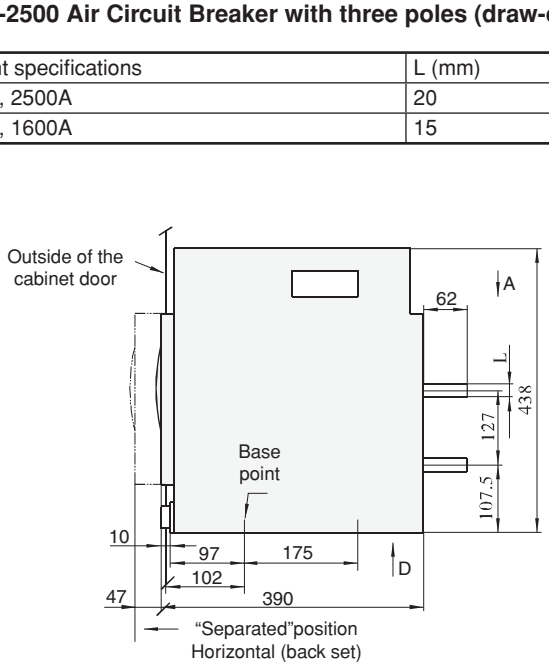


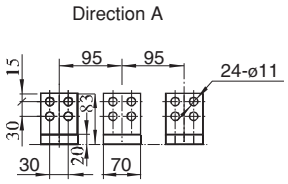
Horizontal (back set)

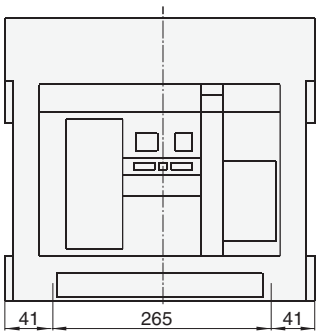
■ Dimensions and mounting, mm

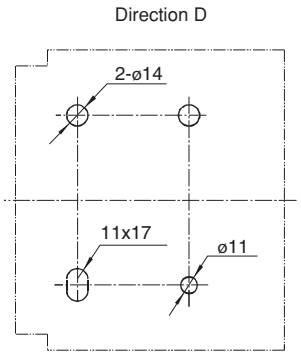
● BT2-2500 Air Circuit Breaker with three poles (draw-out type)

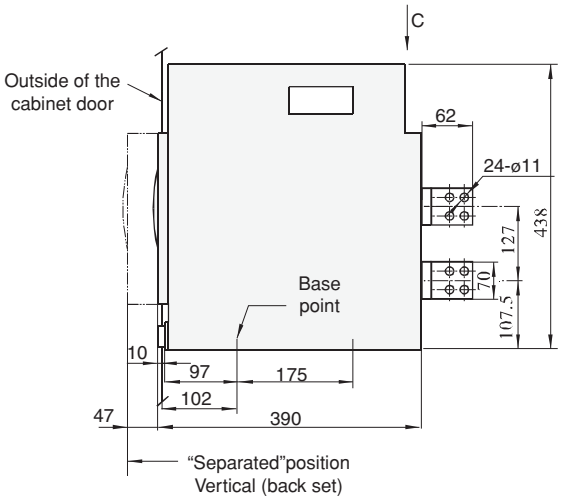
Current specifications	L (mm)
2000A, 2500A	20
1250A, 1600A	15

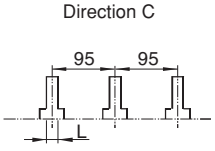








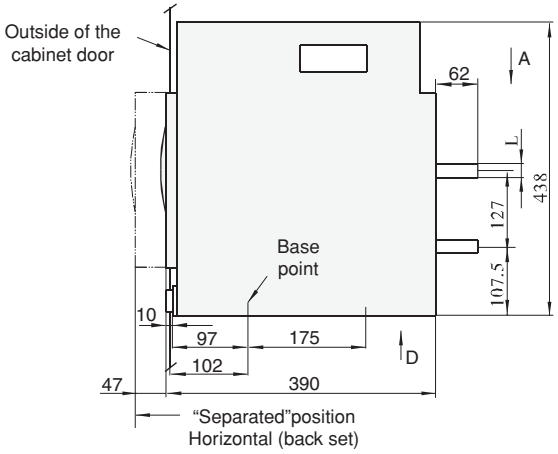


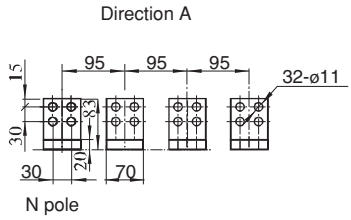


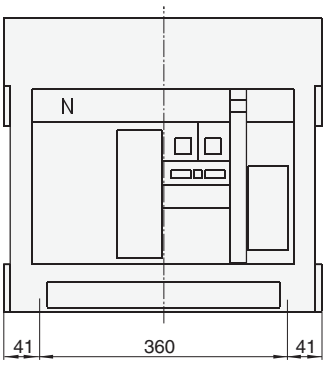
■ Dimensions and mounting, mm

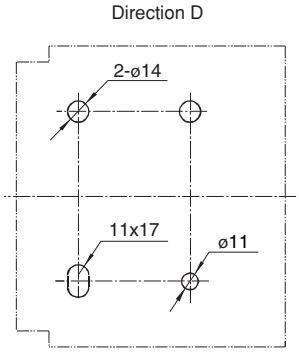
● BT2-2500 Air Circuit Breaker with four poles (draw-out type)

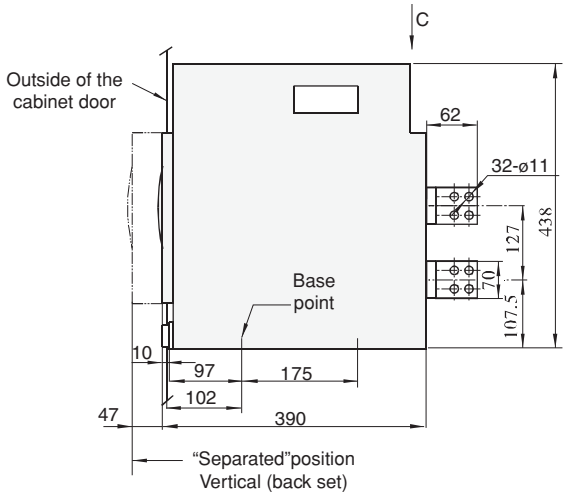
Current specifications	L (mm)
2000A, 2500A	20
1250A, 1600A	15

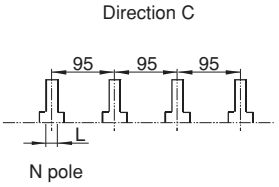








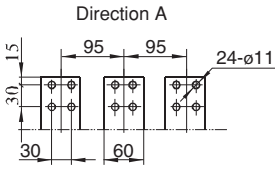


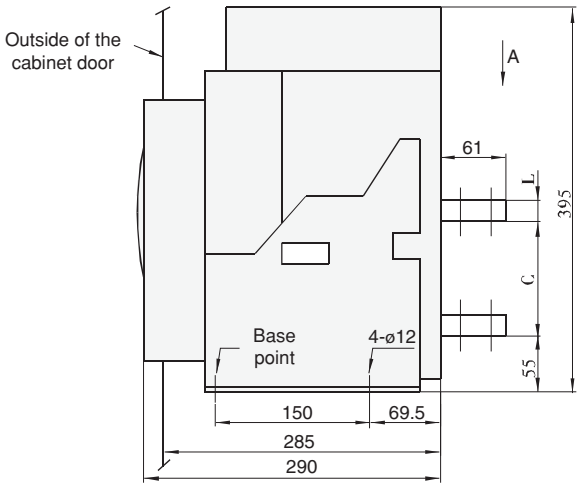


■ Dimensions and mounting, mm

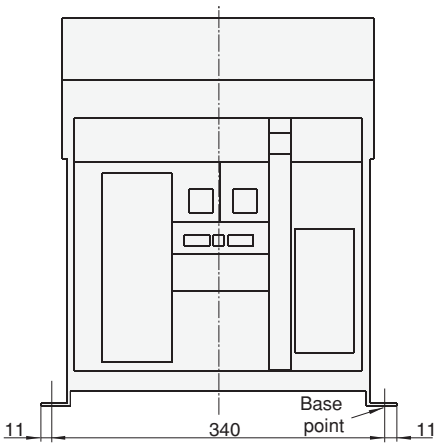
● BT2-2500 Air Circuit Breaker with three poles (fixed type)

Current specifications	L (mm)	C (mm)
2000A, 2500A	20	132
1250A, 1600A	15	134.5



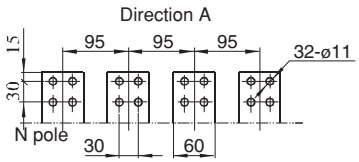


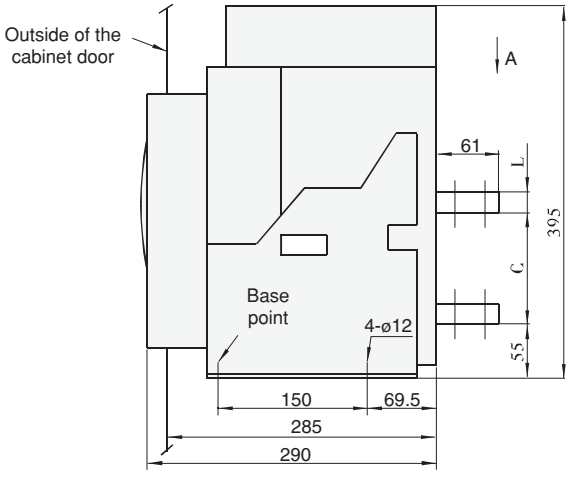
Horizontal (back set)



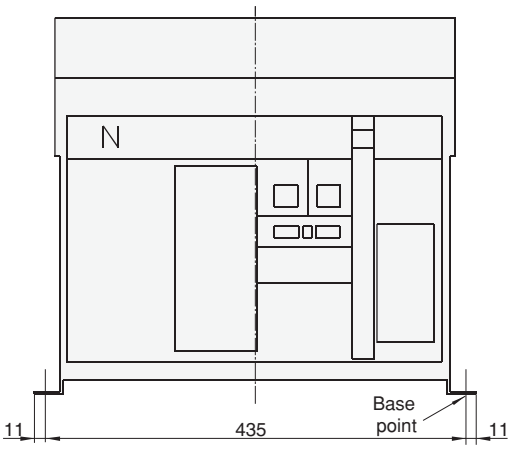
● BT2-2500 Air Circuit Breaker with four poles (fixed type)

Current specifications	L (mm)	C (mm)
2000A, 2500A	20	132
1250A, 1600A	15	134.5



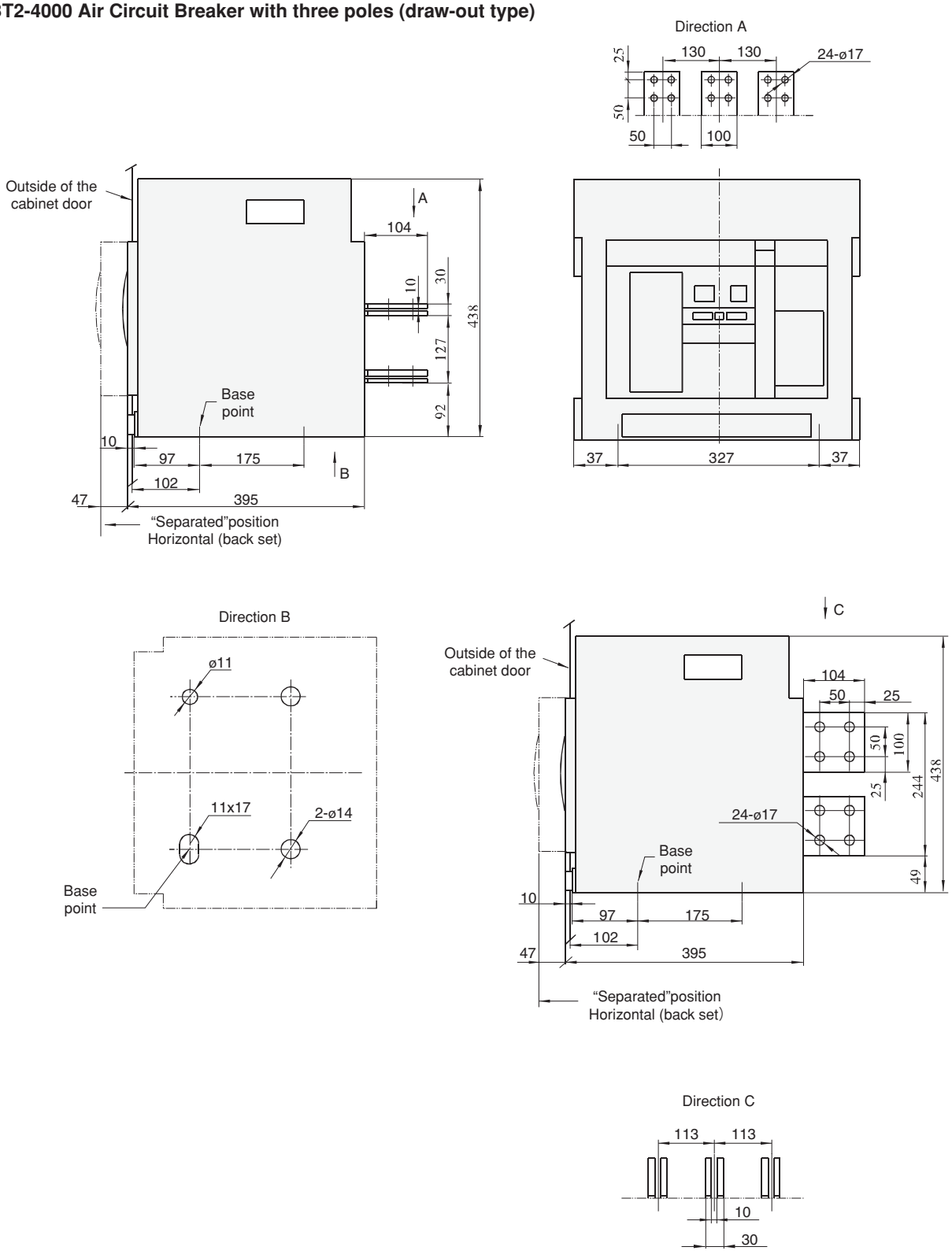


Horizontal (back set)



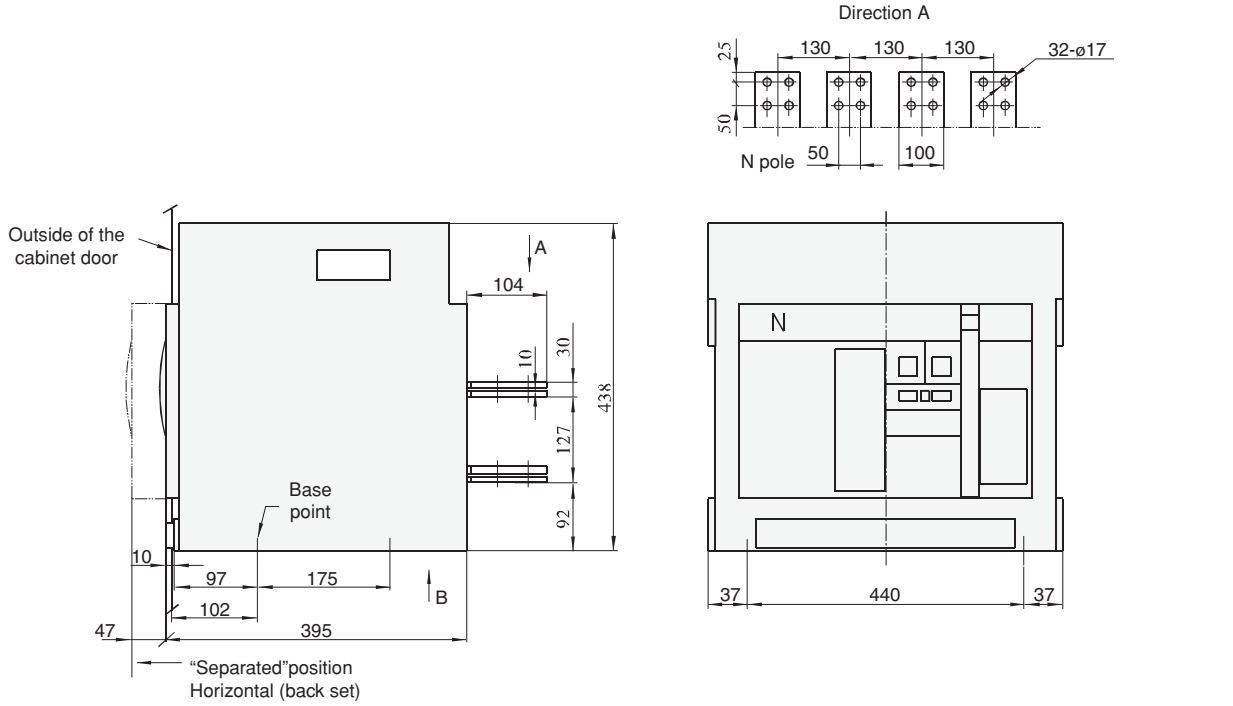
■ **Dimensions and mounting, mm**

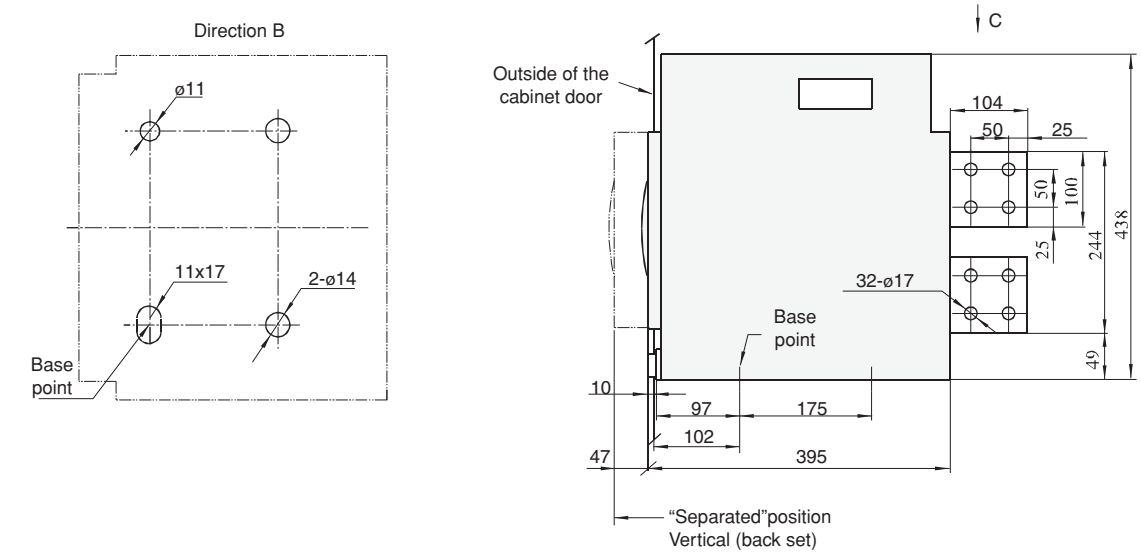
● **BT2-4000 Air Circuit Breaker with three poles (draw-out type)**

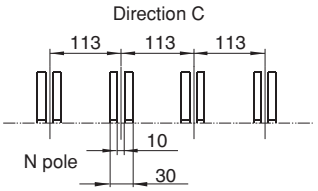


■ Dimensions and mounting, mm

● BT2-4000 Air Circuit Breaker with four poles (draw-out type)

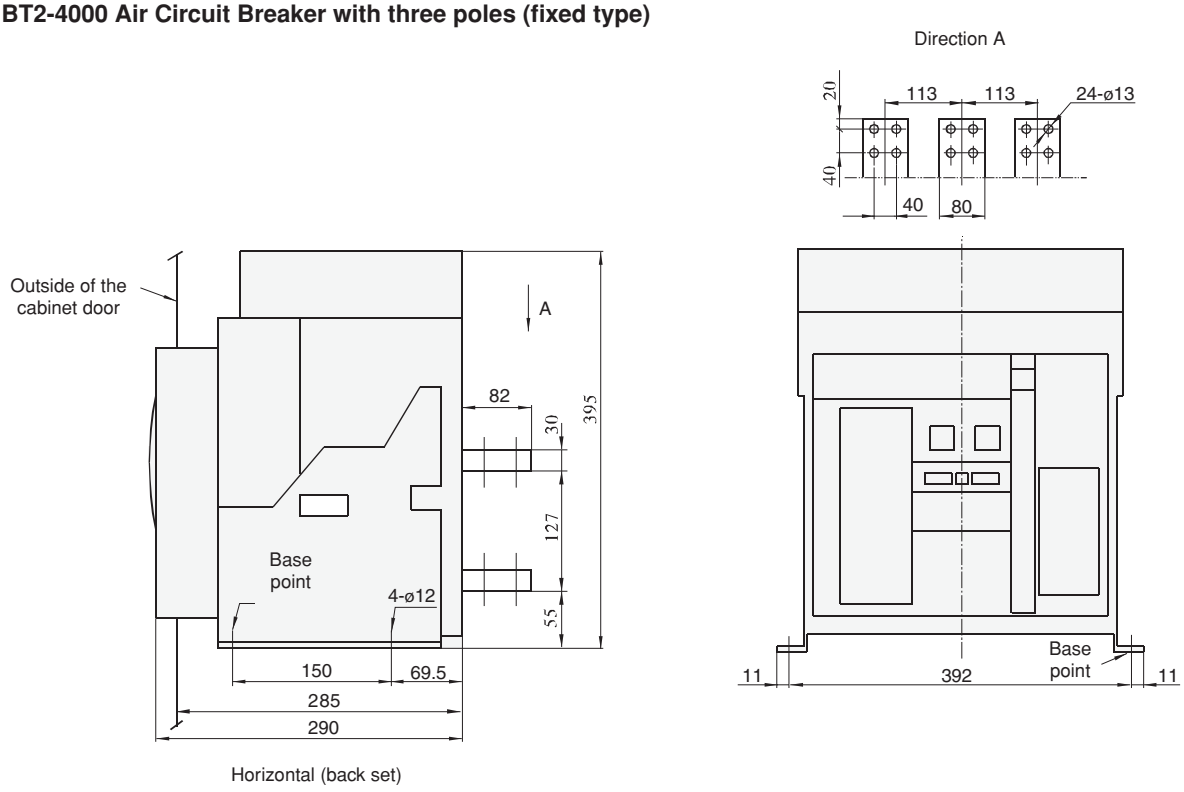




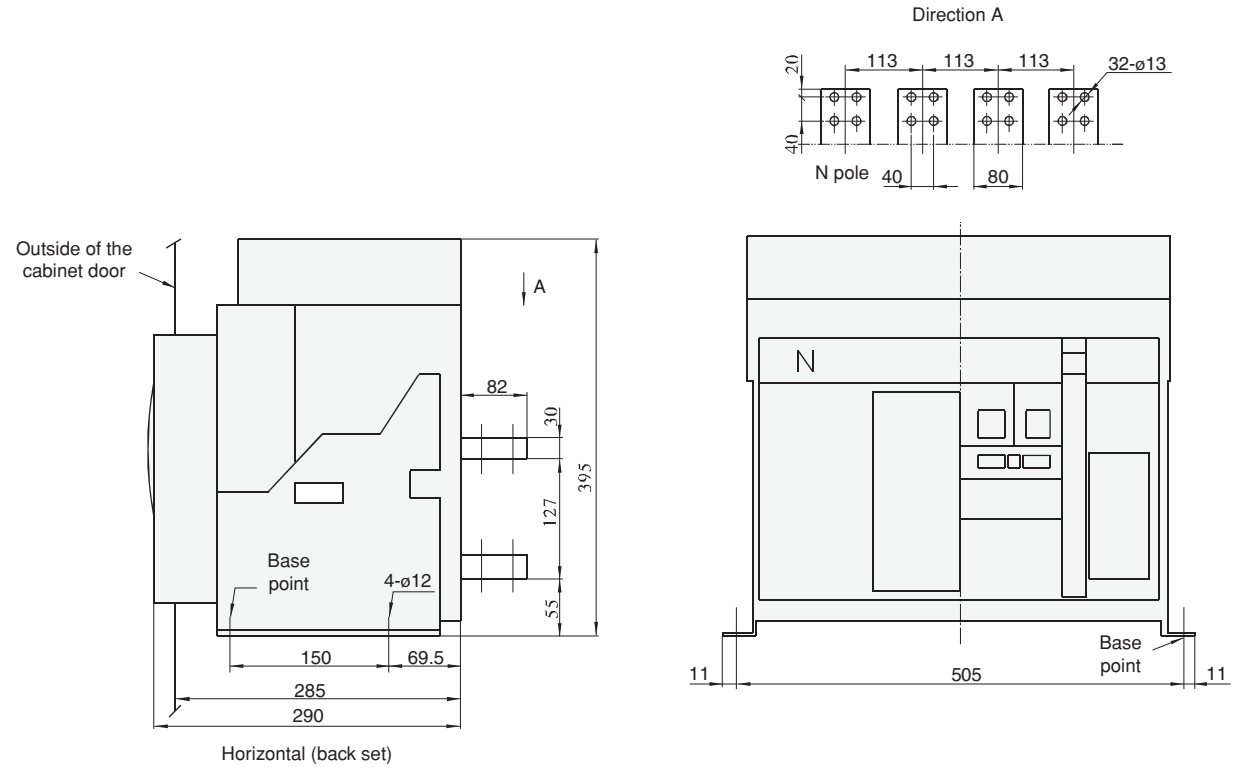


■ **Dimensions and mounting, mm**

● **BT2-4000 Air Circuit Breaker with three poles (fixed type)**

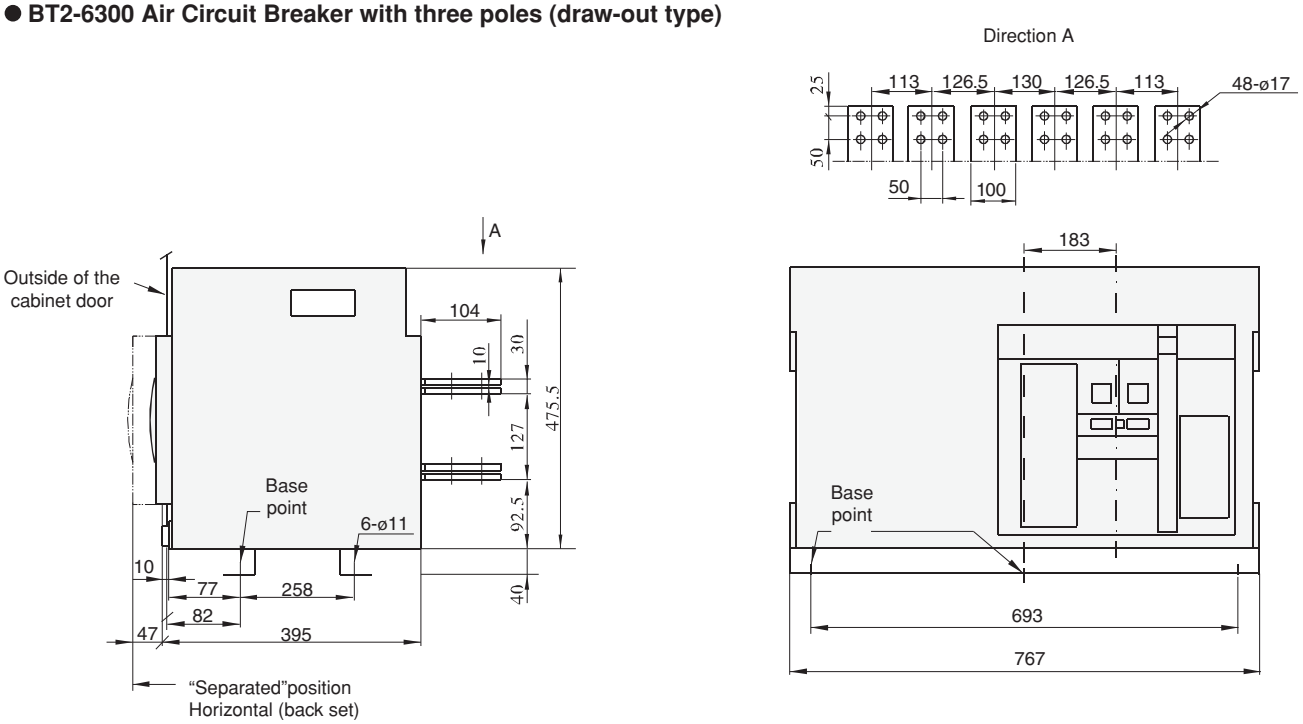


● **BT2-4000 Air Circuit Breaker with four poles (fixed type)**

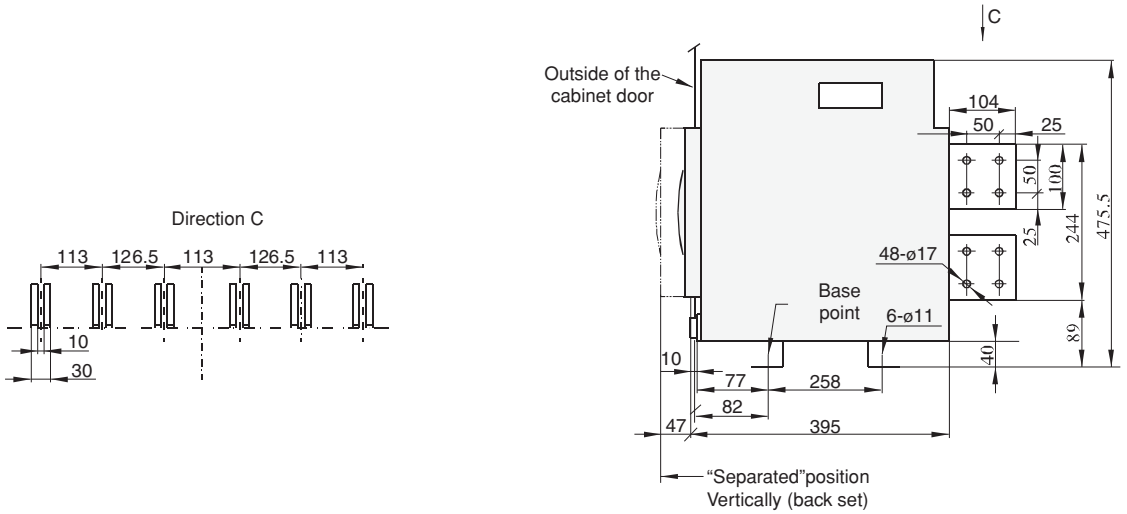


■ Dimensions and mounting, mm

● BT2-6300 Air Circuit Breaker with three poles (draw-out type)



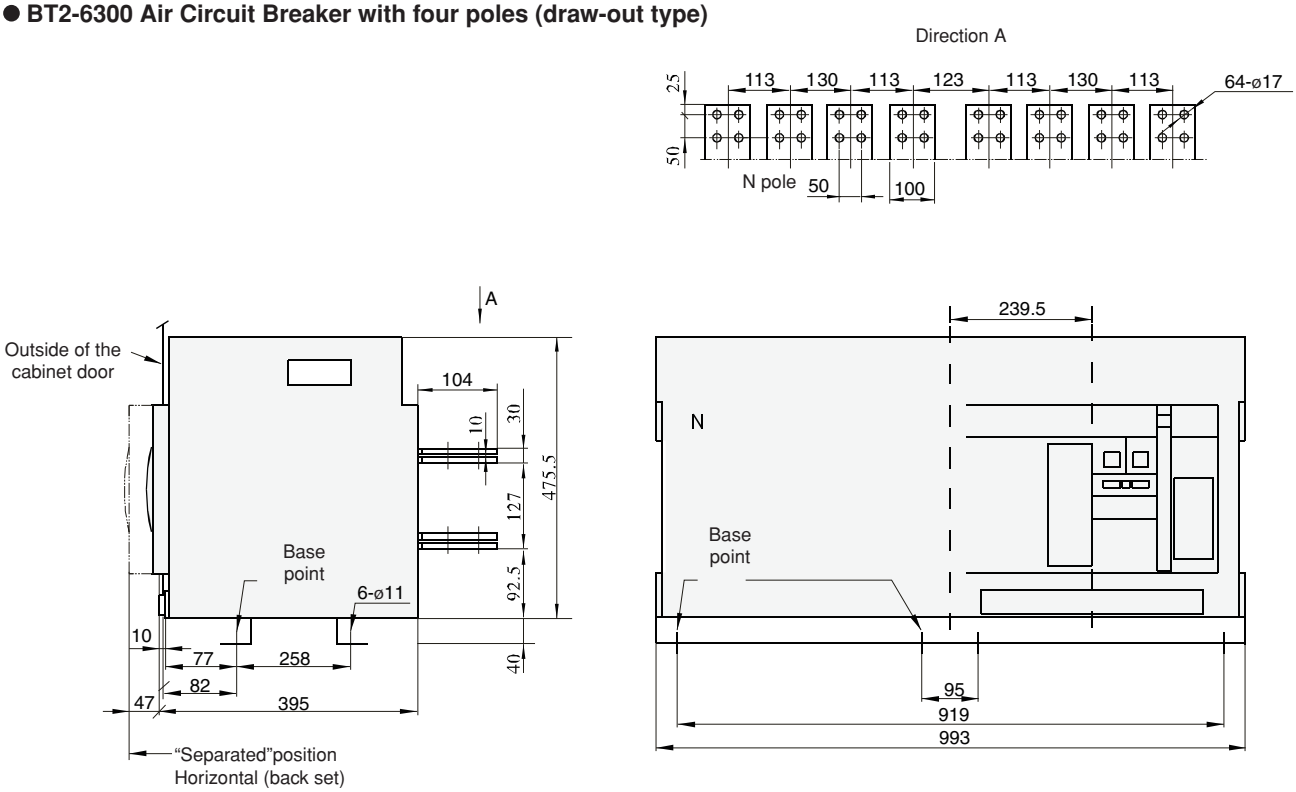
Current specifications:
In=4000A, 5000A



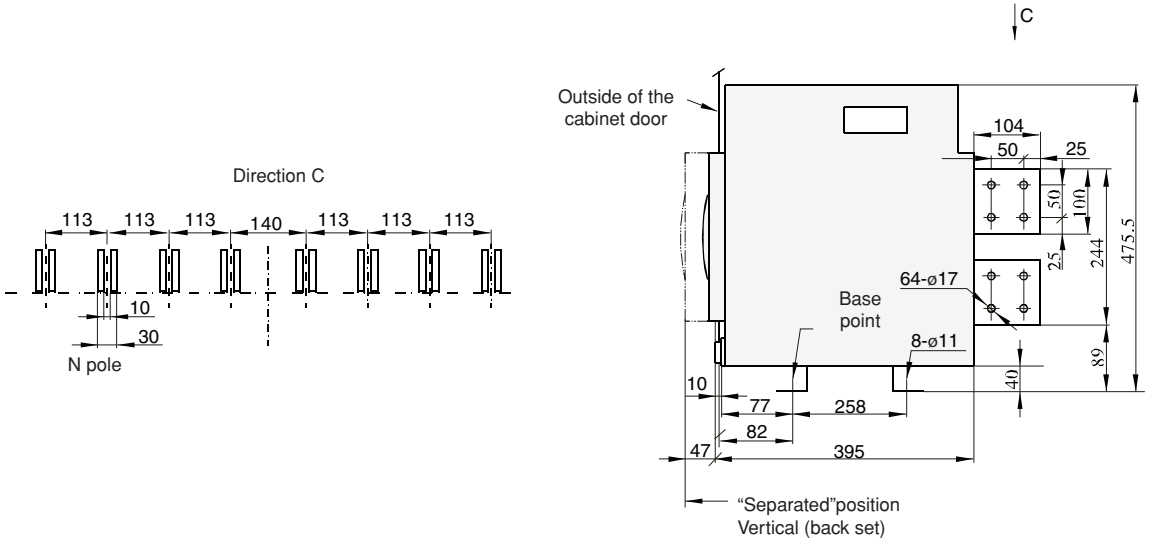
Current specifications:
In=4000A, 5000A, 6300A

■ **Dimensions and mounting, mm**

● **BT2-6300 Air Circuit Breaker with four poles (draw-out type)**



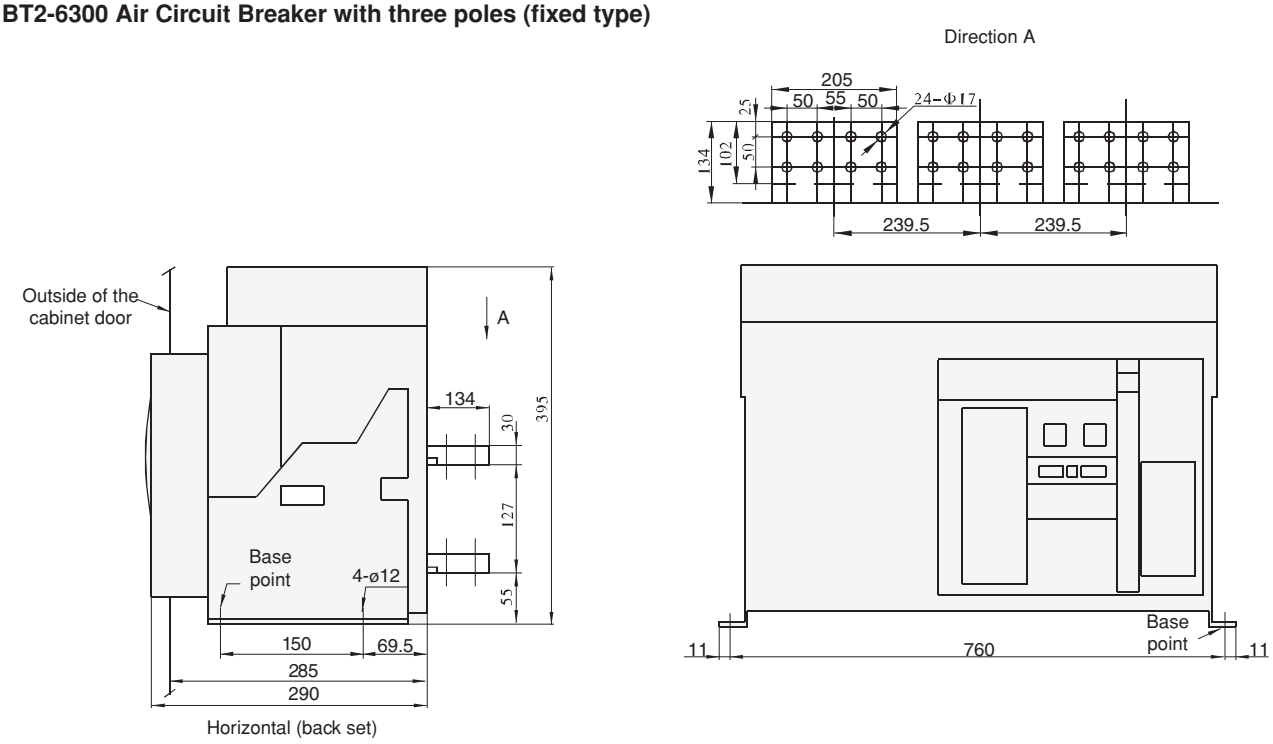
Current specifications:
In=4000A, 5000A



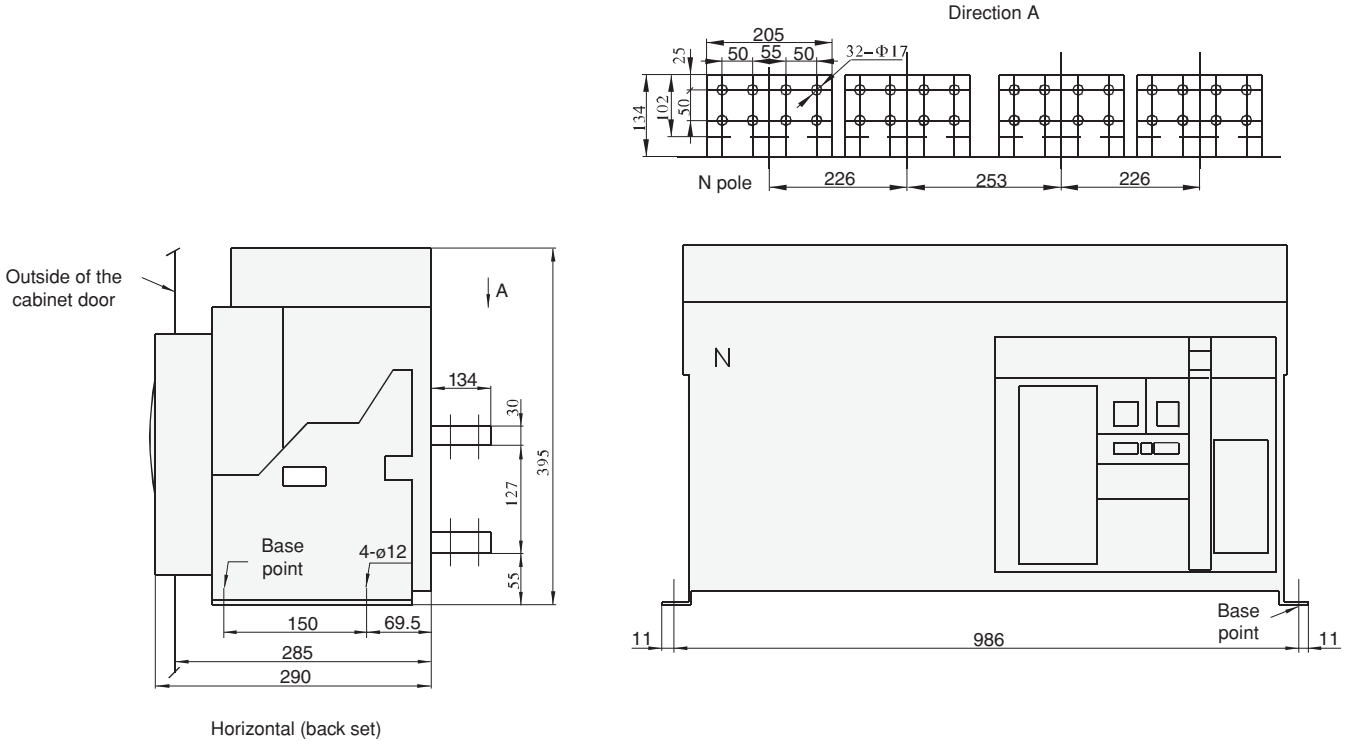
Current specifications:
In=4000A, 5000A, 6300A

■ Dimensions and mounting, mm

● BT2-6300 Air Circuit Breaker with three poles (fixed type)



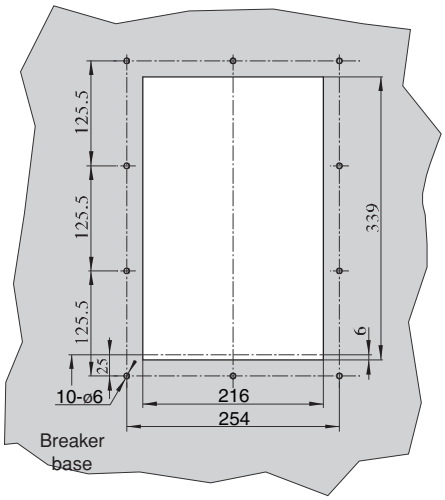
● BT2-6300 Air Circuit Breaker with four poles (fixed type)



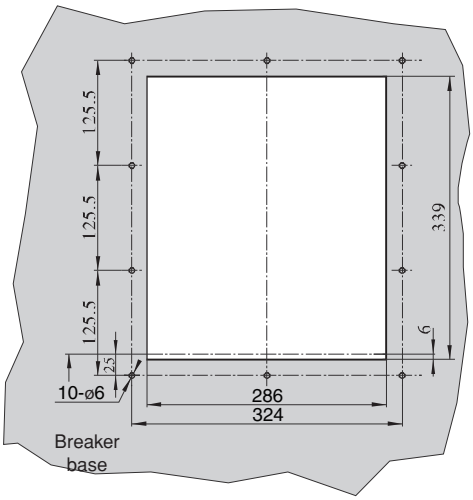
■ **Door frame dimensions, mm**

● **BT2-1600 door frame**

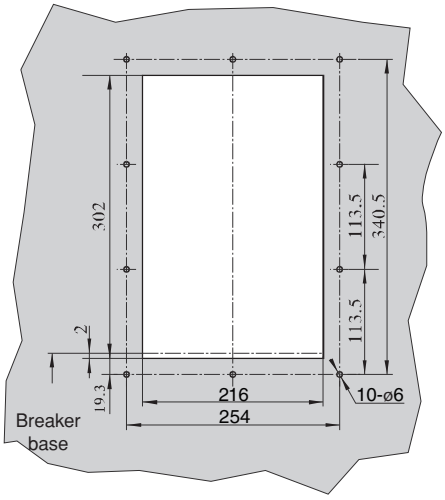
BT2-1600 Air Circuit Breakers with three poles (draw-out)
The drawing of aperture dimensions for mounting cover of door frame
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 227mm



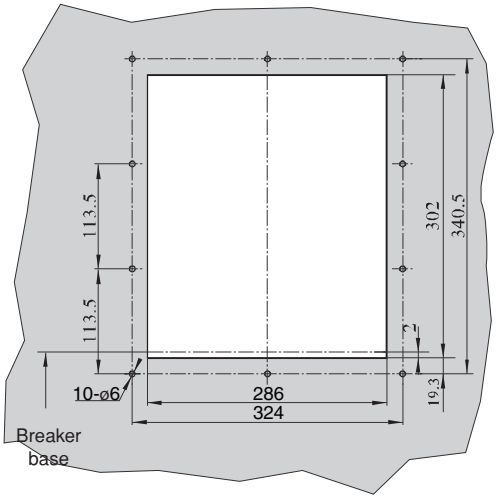
BT2-1600 Air Circuit Breakers with four poles (draw-out)
The drawing of aperture dimensions for mounting front cover of door frame
Distance from the panel center of the Circuit Breaker to the right hinge of cabinet door should be at least 262mm



BT2-1600 Air Circuit Breakers with three poles (fixed type)
The drawing of aperture dimensions for mounting cover of door frame
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 227mm



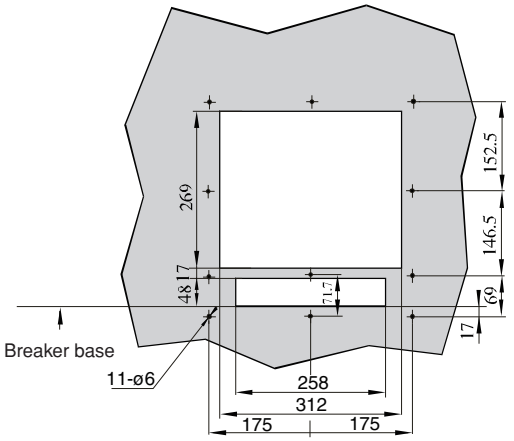
BT2-1600 Air Circuit Breakers with four poles (fixed type)
The drawing of aperture dimensions for mounting front cover of door frame
Distance from the panel center of the Circuit Breaker to the right hinge of cabinet door should be at least 262mm



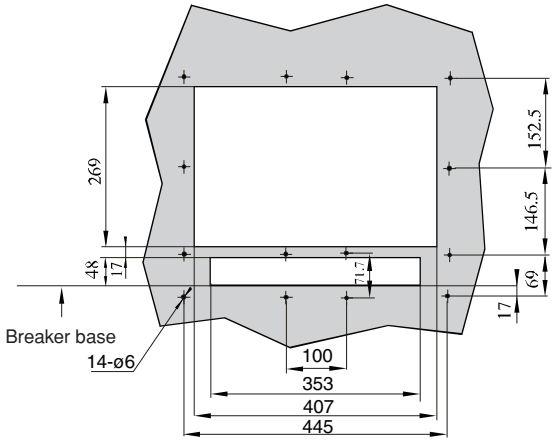
■ Door frame dimensions, mm

● Aperture Dimension of BT2-2000 door frame

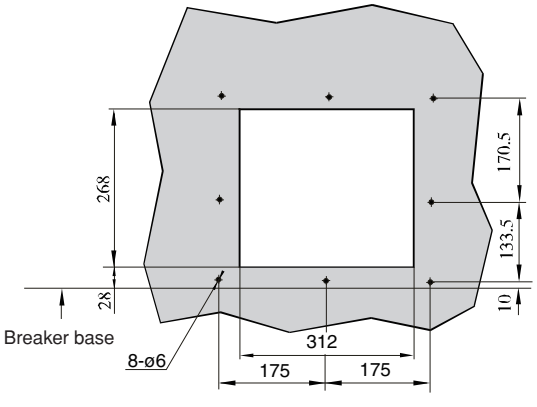
BT2-2000 Air Circuit Breakers with three poles (draw-out)
The drawing of Aperture Dimensions for mounting front cover of cabubet door
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 256mm



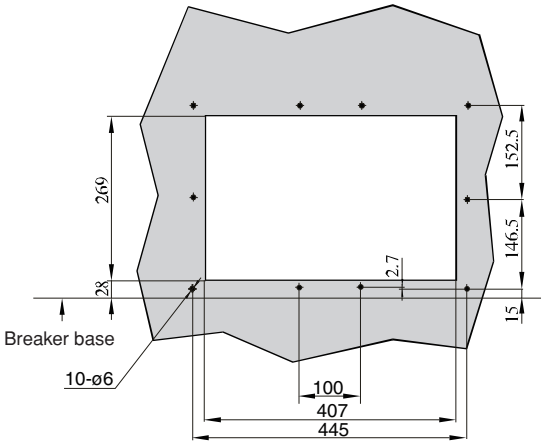
BT2-2000 Air Circuit Breakers with four poles (draw-out)
The drawing of Aperture Dimensions for mounting front cover of cabinut door
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 303.5mm



BT2-2000 Air Circuit Breakers with three poles (fixed)
The drawing of Aperture Dimensions for mounting front cover of cabunet door
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 256mm



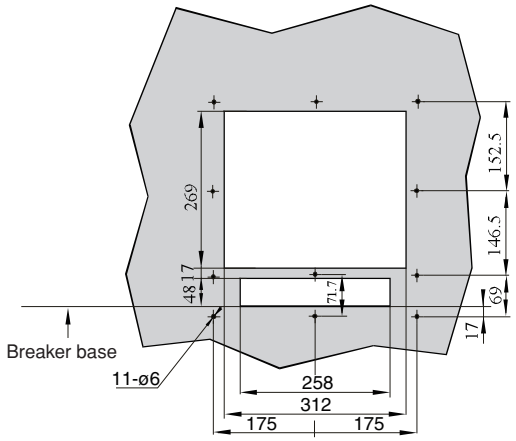
BT2-2000 Air Circuit Breakers with four poles (fixed)
The drawing of Aperture Dimensions for mounting front cover of cabinut door
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 303.5mm



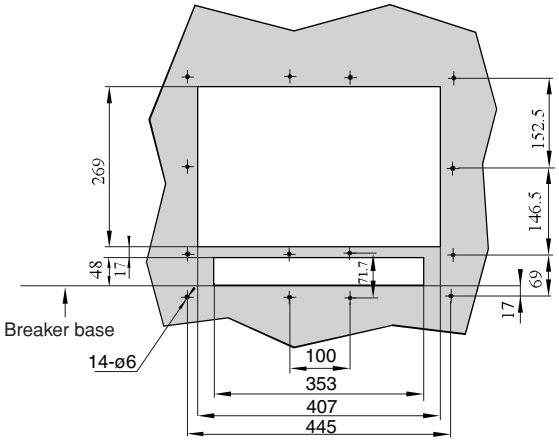
■ **Door frame dimensions, mm**

● **Aperture Dimension of BT2-2500 door frame**

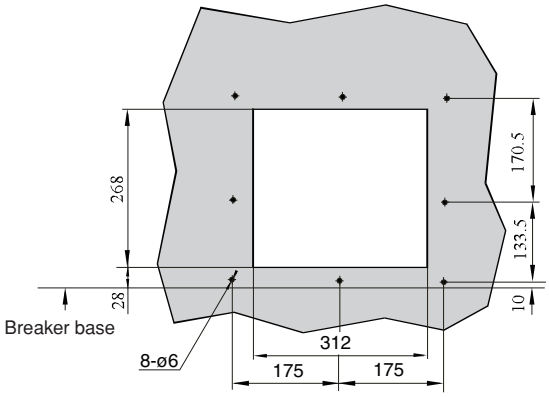
BT2-2500 Air Circuit Breakers with three poles (draw-out)
The drawing of Aperture Dimensions for mounting cover of door frame
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 256mm



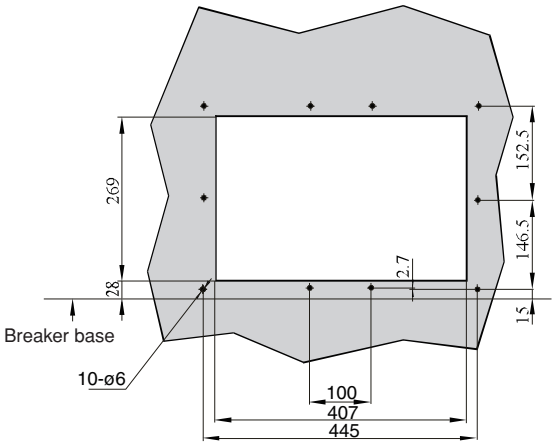
BT2-2500 Air Circuit Breakers with four poles (draw-out)
The drawing of Aperture Dimensions for mounting cover of door frame
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 303.5mm



BT2-2500 Air Circuit Breakers with three poles (fixed)
The drawing of Aperture Dimensions for mounting cover of door frame
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 256mm



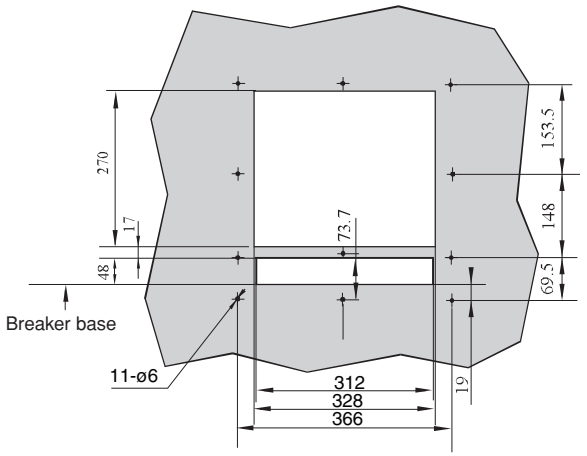
BT2-2500 Air Circuit Breakers with four poles (fixed)
The drawing of Aperture Dimensions for mounting cover of door frame
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 303.5mm



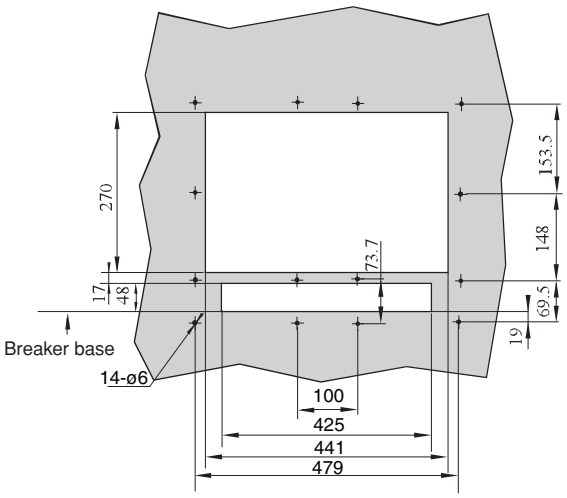
■ Door frame dimensions, mm

● Aperture Dimension of BT2-4000 door frame

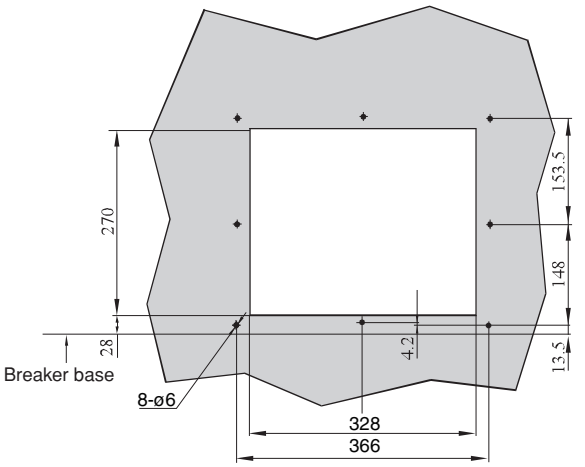
BT2-4000 Air Circuit Breakers with three poles (draw-out)
The drawing of Aperture Dimensions for mounting cover of door frame
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 264mm



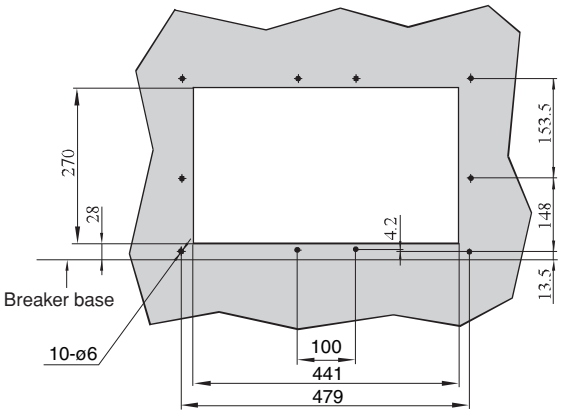
BT2-4000 Air Circuit Breakers with four poles (draw-out)
The drawing of Aperture Dimensions for mounting cover of door frame
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 320.5mm



BT2-4000 Air Circuit Breakers with three poles (fixed)
The drawing of Aperture Dimensions for mounting cover of door frame
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 264mm



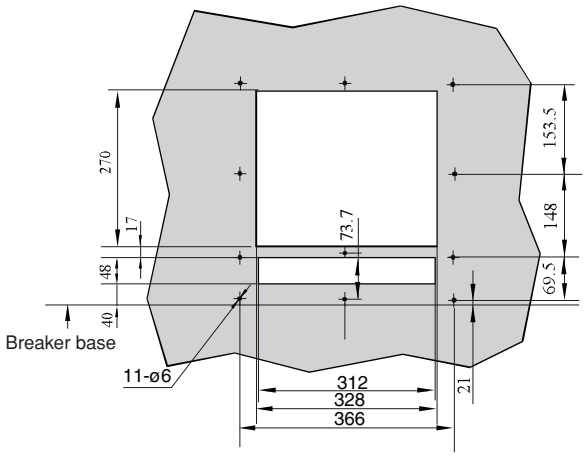
BT2-4000 Air Circuit Breakers with four poles (fixed)
The drawing of Aperture Dimensions for mounting cover of door frame
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 320.5mm



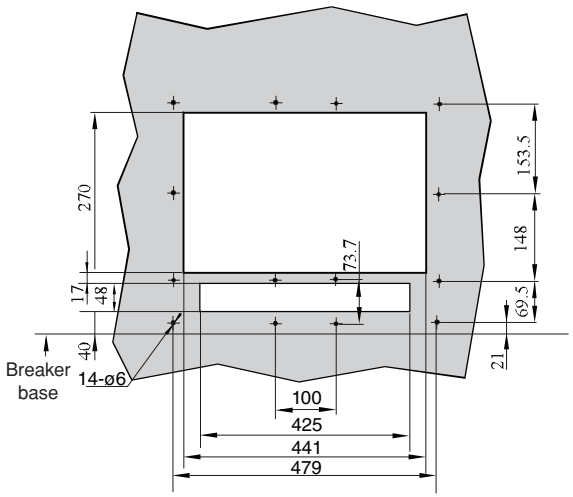
■ **Door frame dimensions, mm**

● **Aperture Dimension of BT2-6300 door frame**

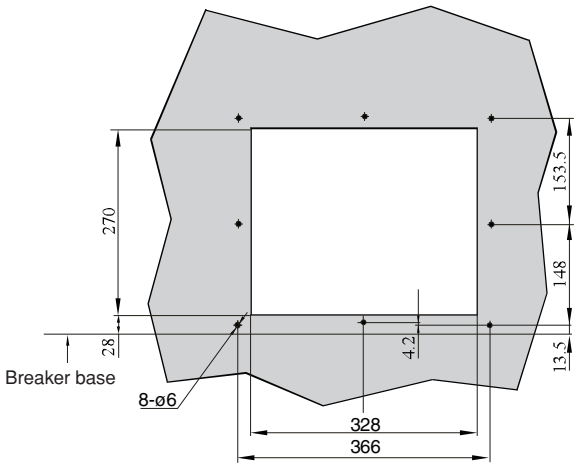
BT2-6300 Air Circuit Breakers with three poles (draw-out)
The drawing of Aperture Dimensions for mounting cover of door frame
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 264mm



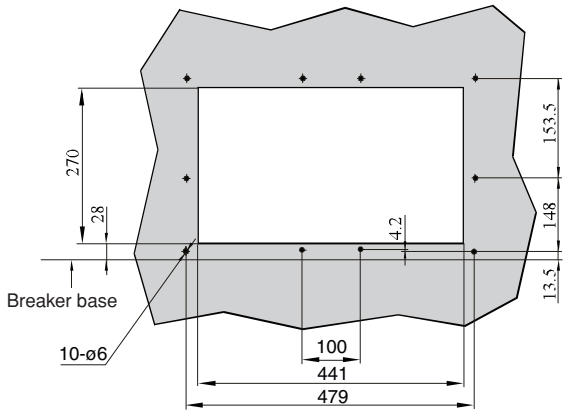
BT2-6300 Air Circuit Breakers with four poles (draw-out)
The drawing of Aperture Dimensions for mounting cover of door frame
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 320.5mm



BT2-6300 Air Circuit Breakers with three poles (fixed)
The drawing of Aperture Dimensions for mounting cover of door frame
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 264mm

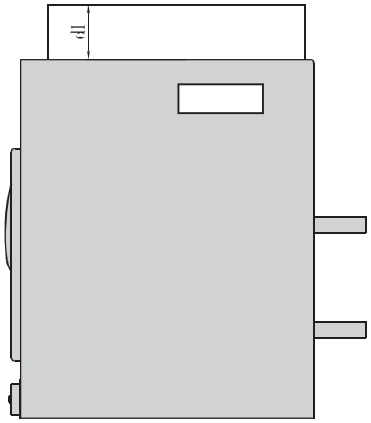


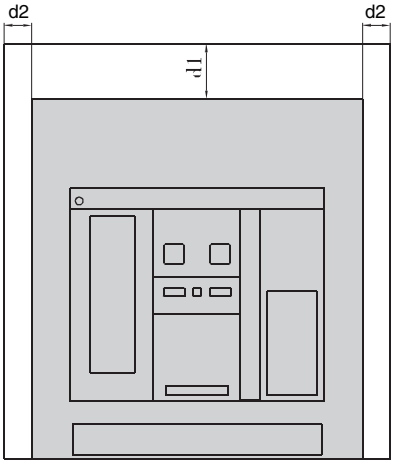
BT2-6300 Air Circuit Breakers with four poles (fixed)
The drawing of Aperture Dimensions for mounting cover of door frame
Distance from the panel center of the circuit breaker to the right hinge of cabinet door should be at least 320.5mm



■ Mounting safety clearance

● Draw-out breaker

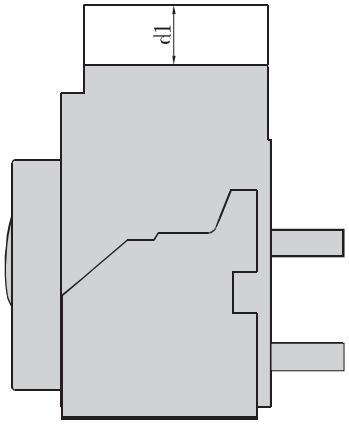


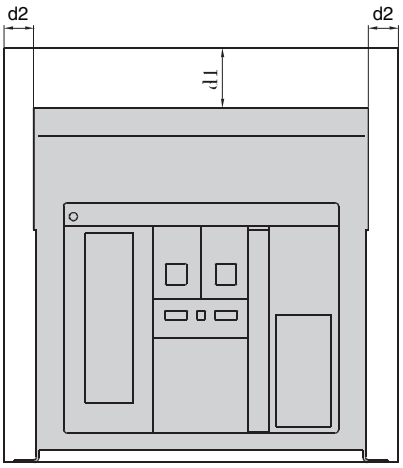


Minimum distance between breaker with switchboard wall or live part.

	Switchboard wall	Live part
d1 (note) (mm)	0	60
d2 (mm)	0	60

● Fixed breaker





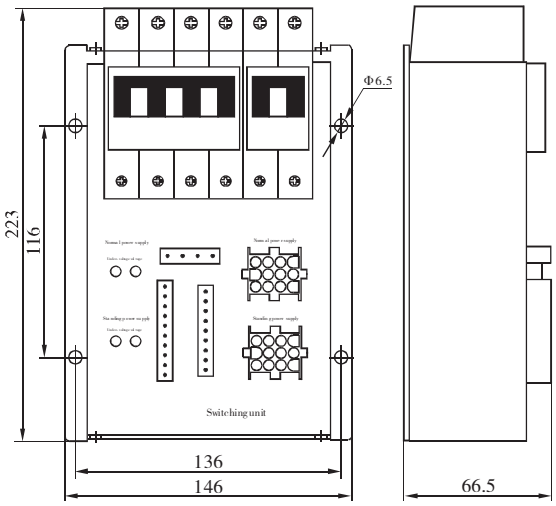
Minimum distance between breaker with switchboard wall or live part.

	Switchboard wall	Live part
d1 (note) (mm)	0	60
d2 (mm)	0	60

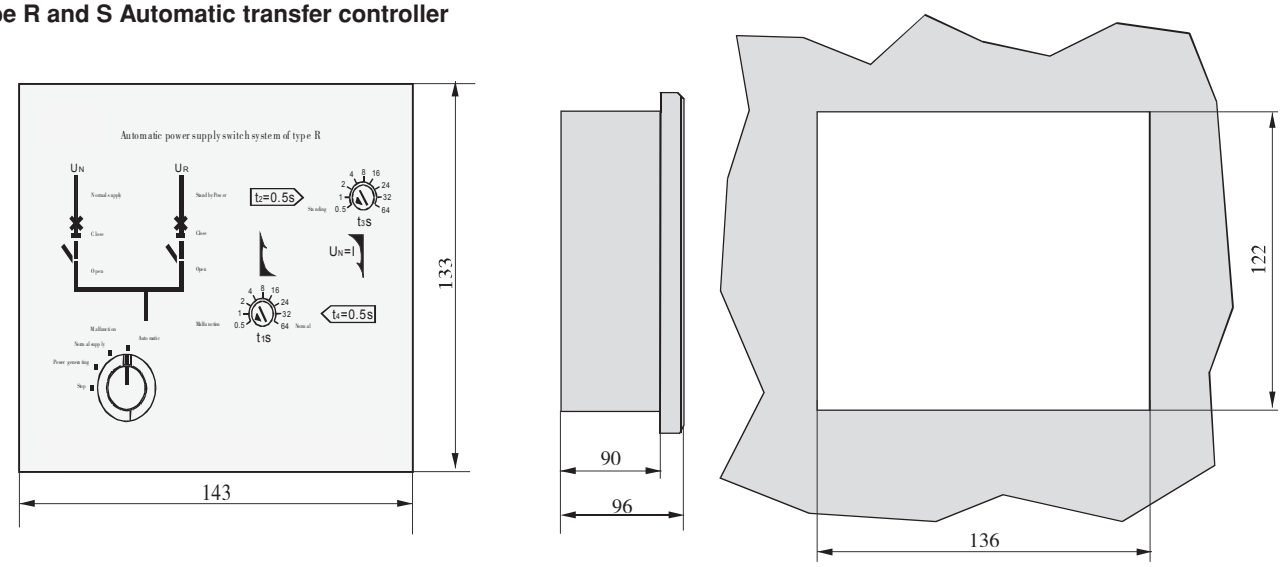
Note:secondary circuit wiring must be considered for safety clearance.

■ Dimensions and mounting of Automatic transfer switch (ATS), mm

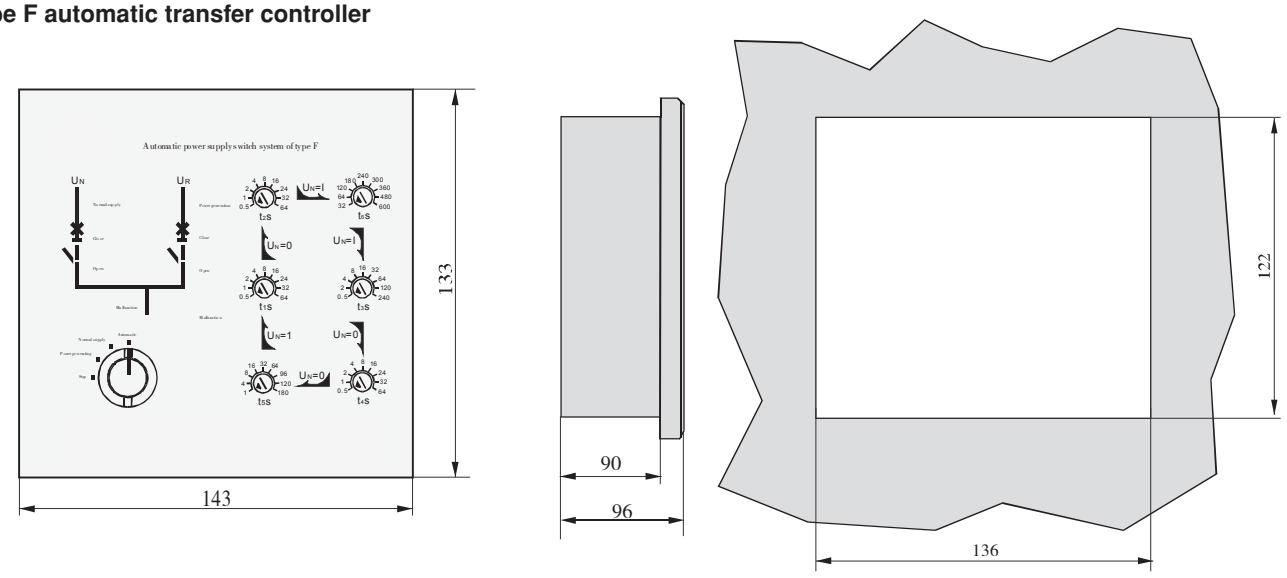
● The switching unit



● Type R and S Automatic transfer controller

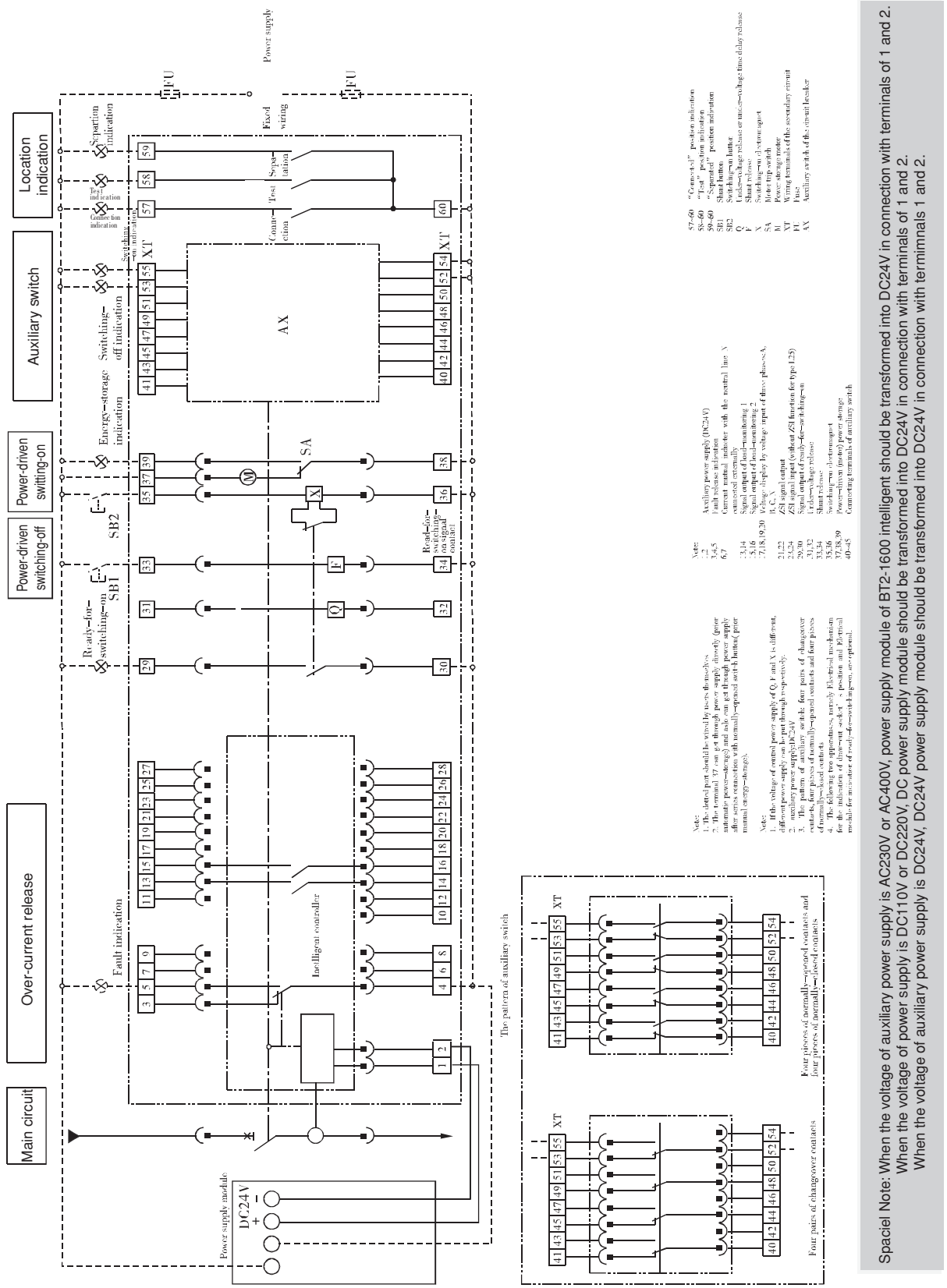


● Type F automatic transfer controller



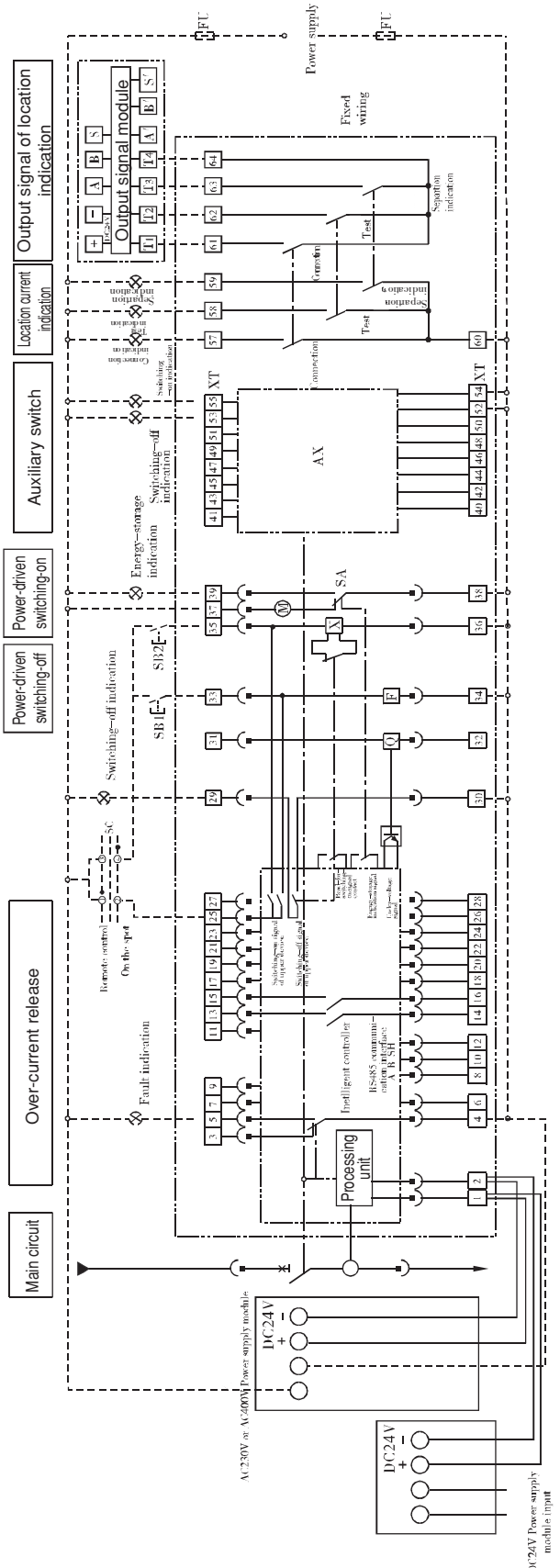
■Wiring diagram of secondary circuit

Wiring diagram of the secondary circuit of BT2-1600 circuit breakers equipped with type L25, M25, M26, P25 and P26 intelligent controllers (OCR)


Main circuit
Over-current release
Auxiliary switch
Power-driven switching-off
Power-driven switting-on
Location indication
Power supply
Fixed wiring
Separation indication
Test indication
Connection indication
Switching-on indication
Switching-off indication
Energy-storage indication
Ready-for-switching-on
Fault indication
Intelligent controller
Power supply module
DC24V
The pattern of auxiliary switch
Four pairs of changeover contacts
Four pieces of normally-opened contacts and four pieces of normally-closed contacts
SA
SB1
SB2
AX
XT
Note:
1. The dotted part should be wired by users themselves.
2. The terminal 57 can get through power supply directly prior automatic power-storage) and also can get through power supply after series connection with normally-opened switch button(prior manual energy-storage).
Note:
1. If the voltage of control power supply of Q, F and X is different, different power supplies can be through respectively.
2. auxiliary power supply is DC24V
3. The pattern of auxiliary switch: four pairs of changeover contacts, four pieces of normally-opened contacts and four pieces of normally-closed contacts
4. The following two appendixes, namely Electrical mechanism for the indication of close-out socket-t's position and Electrical module for miniature ed ready-for-switching-on, are optional.
Note:
1,2 Auxiliary power supply (DC24V)
3,4,5 Fault release indication
6,7 Current natital inductor with the neutral line N connected externally
:3,14 Signal output of fault-monitoring 1
:5,16 Signal output of fault-monitoring 2
:7,18,19,20 Voltage display by voltage input of three phases A, B, C
21,22 ZSI signal output
23,24 ZSI signal input (without ZSI function for type L25)
29,30 Signal output of ready-for-switching-on
:31,32 Under-voltage release
33,34 Shunt release
35,36 Switching-on electromagnet
37,38,39 Power-driven (motor) power storage
40-45 Connecting terminals of auxiliary switch
57-60 "Connected" position indication
58-60 "Test" position indication
59-60 "Separated" position indication
SB1 Shunt button
SB2 Switching-on button
Q Under-voltage release or mutch-voltage time delay release
F Shunt release
X Switching-on electromagnet
SA Motor trip switch
M Power storage motor
XT Wiring terminals of the secondary circuit
FU Fuse
AX Auxiliary switch of the circuit breaker

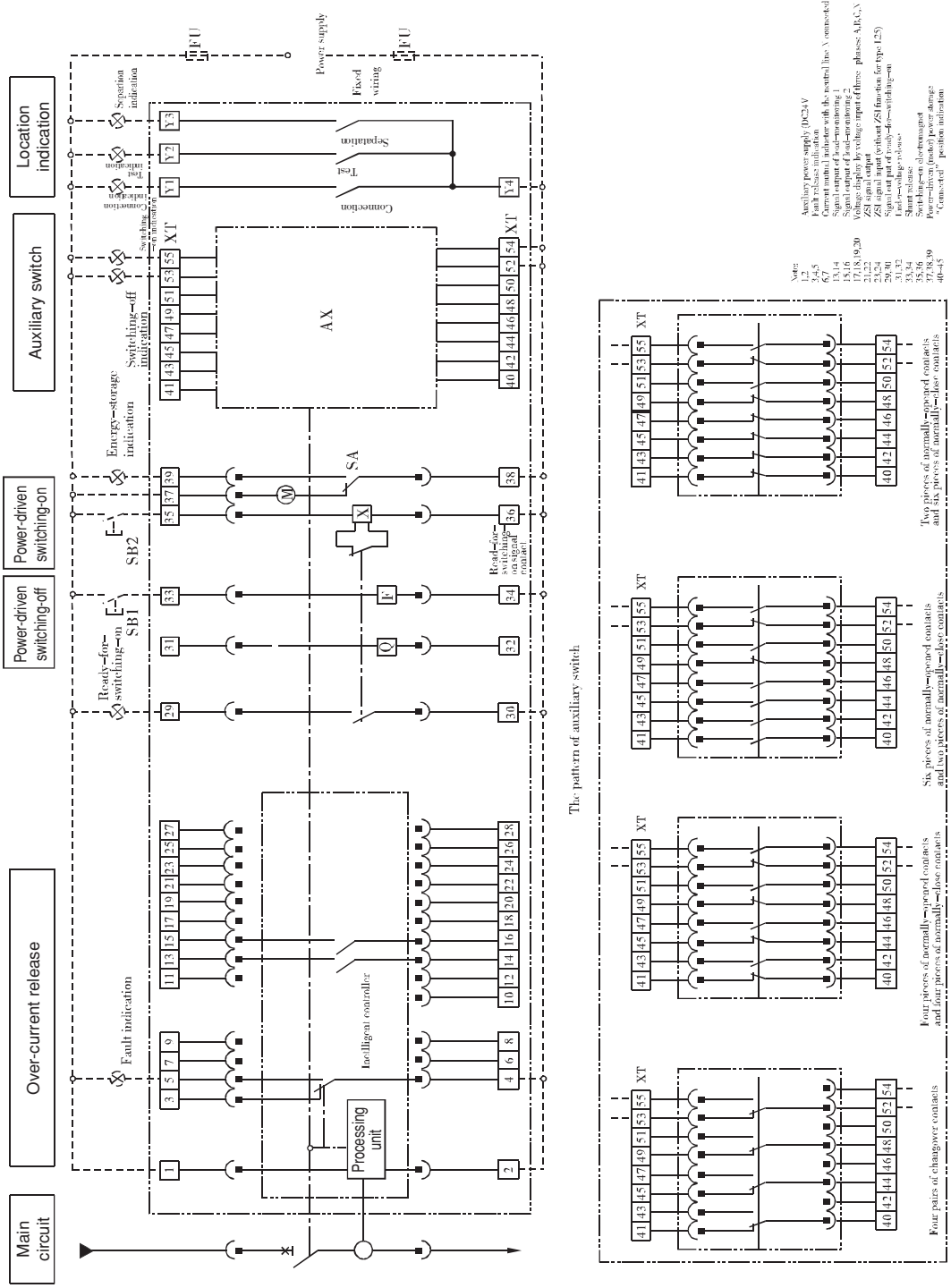
Spaciel Note: When the voltage of auxiliary power supply is AC230V or AC400V, power supply module of BT2-1600 intelligent should be transformed into DC24V in connection with terminals of 1 and 2.
When the voltage of power supply is DC110V or DC220V, DC power supply module should be transformed into DC24V in connection with terminals of 1 and 2.
When the voltage of auxiliary power supply is DC24V, DC24V power supply module should be transformed into DC24V in connection with terminmals 1 and 2.

Wiring diagram of the secondary circuit of BT2-1600 circuit breakers equipped with type H26, P25 and P26 communicate intelligent controllers (OCR)



Special Note: When the voltage of auxiliary power supply is AC230V or AC400V, power supply module of BT2-1600 intelligent should be transformed into DC24V in connection with terminals of 1 and 2.
When the voltage of power supply is DC110V or DC220V, DC power supply module should be transformed into DC24V in connection with terminals of 1 and 2.
When the voltage of auxiliary power supply is DC24V, DC24V power supply module should be transformed into DC24V in connection with terminals of 1 and 2.

Wiring diagram of the secondary circuit of BT2-2000~6300 circuit breakers equipped with type L25, M25, M26, P26 intelligent controllers (OCR)



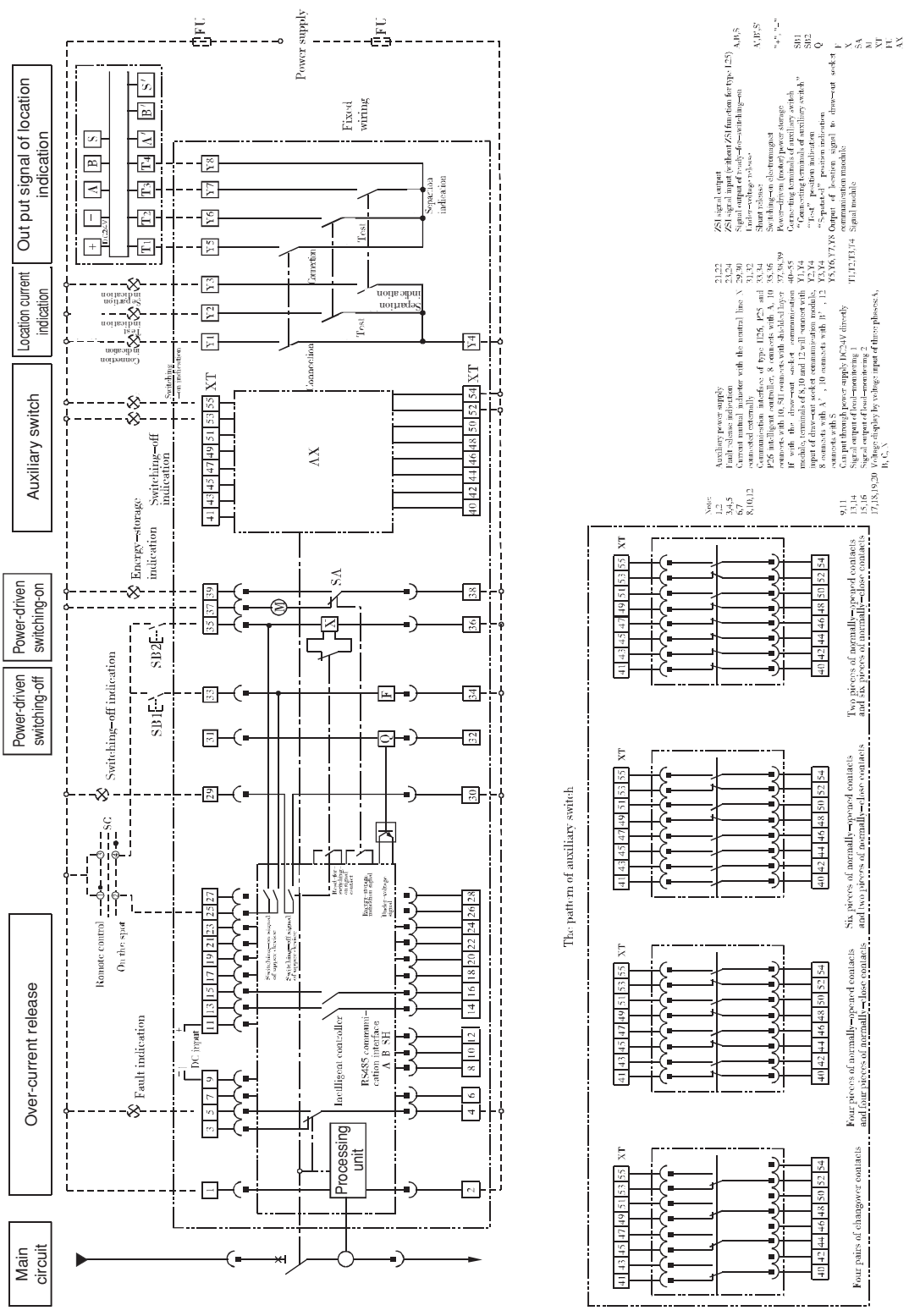
Note:
1. The control part should be wired by users themselves.
2. The terminal 37 can get through power supply directly (prior automatic power-storage) and also can get through power supply after series connection with normally-opened switch button(prior manual energy-storage).

Note:
1. If the voltage of control power supply of Q, F and X is different, different power supply can be put through respectively.
2. Auxiliary power supply : AC220V, AC400V
3. When the auxiliary power supply is DC110V, 220V, it can be transformed into DC24V by controller power supply module" to the intelligent controller.
4. The pattern of auxiliary switch: four pairs of changeover contacts, four pieces of normally-opened contacts (XO) and four pieces of normally-closed contacts (XC), six pieces of XO and two pieces of XC, two pieces of XO and six pieces of XC.
5.Electrical indicator of drag-out Socket position and signal output of electrical indication module for ready-for switching-on.

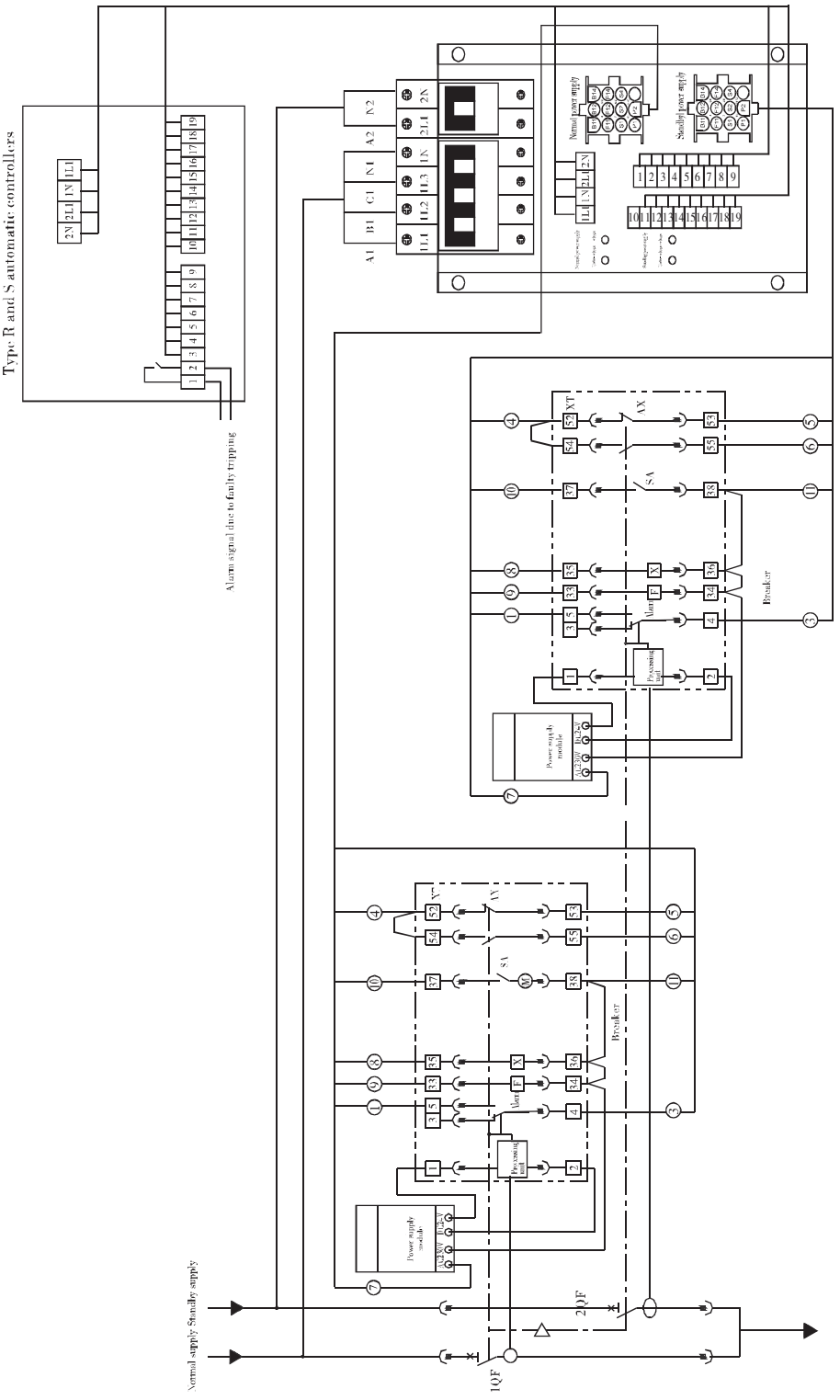
Note	
1,2	Auxiliary power supply (DC24V
3,4,5	Fault release indication
6,7	Current mutual inductor with the neutral line (connected externally
13,14	Signal output of dual-monitoring 1
15,16	Signal output of dual-monitoring 2
17,18,19,20	Voltage display by voltage input of three phases A,B,C)
21,22	ZSI signal input (without ZSI function for type L25)
23,24	ZSI signal output
29,30	Signal out put of ready-for-switching-on
31,32	Fault-voltage release
33,34	Shunt release
35,36	Switching-on electromagnet
37,38,39	Power-driven (motor) power storage
40~45	"Connected" position indication

Y1,Y4	"Connecting terminals of auxiliary switch"
Y2,Y4	"Test" position indication
Y3,Y4	"Separated" position indication
SB1	Shunt button
SB2	Switching-on button
Q	Under-voltage release or under-voltage time delay release
F	Shunt release
X	Switching-on electromagnet
SA	Motor trip switch
M	Power storage motor
XT	Wiring terminals of the secondary circuit
FU	Fuse
AX	Auxiliary switch of the circuit breaker

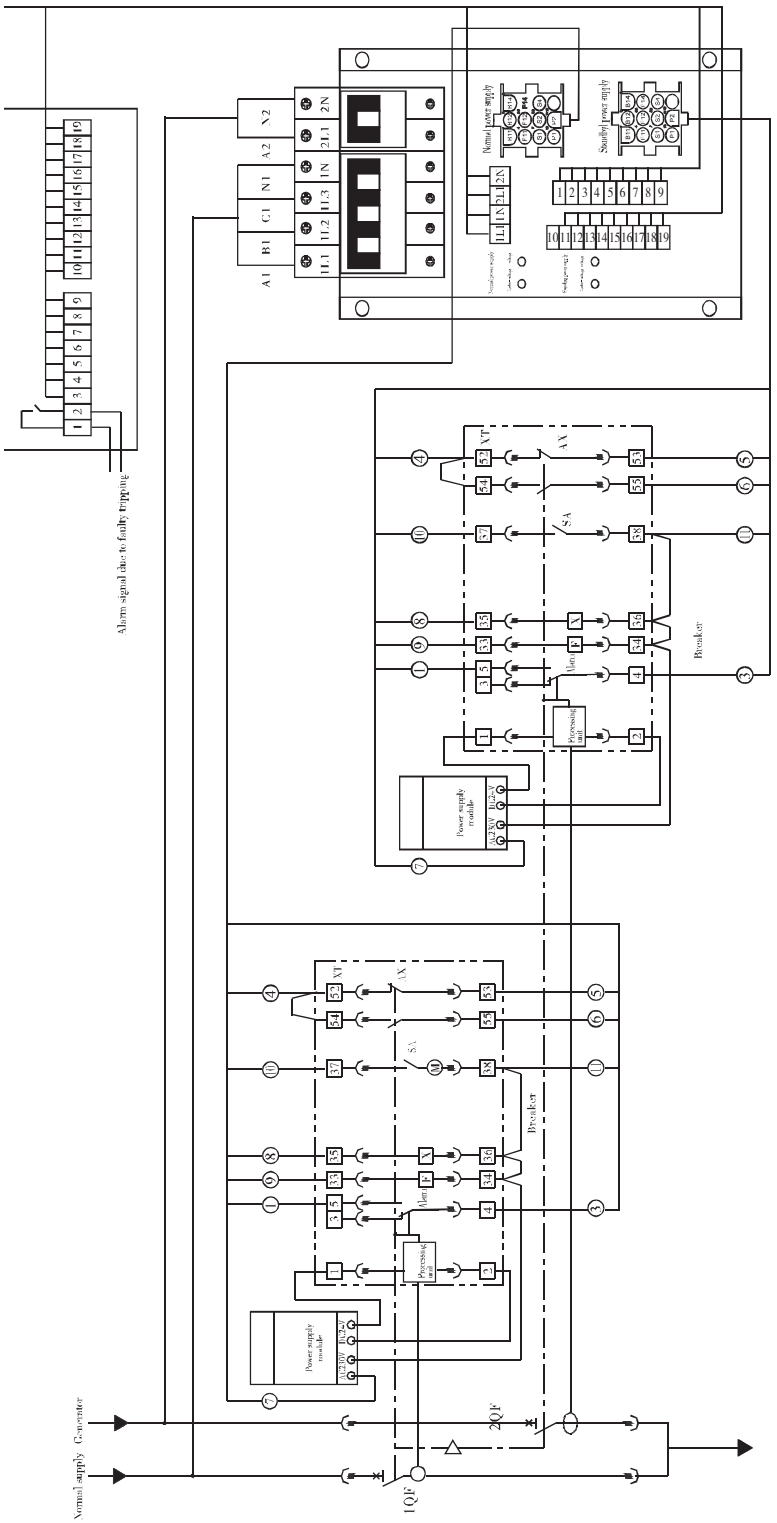
Wiring diagram of the secondary circuit of BT2-2000~6300 circuit breakers equipped with type H26, P25, and P26 communicate intelligent controllers (OCR)



Wiring diagram of the automatic transfer switch (ATS) for normal supply to standby supply system
BT2-1600 circuit breakers and the auxiliary switch has four pairs of change-over contacts


Type R and S automatic controllers
Alarm signal due to faulty tripping
Normal supply
Standby supply
1QF
2QF
Power supply module
Processing unit
Breaker
Note:1.As shown in the above diagram the breaker is open and connecting it has been charged and there is no current in the loop.
2.When ATS is used DC24V voltage for intelligent controller,AC230V voltage for shunt release, closing magnet and automatic operation mechanism.
AX–Auxiliary switch
F–Shunt release
X–The electro–magnet to close the breaker
M–Charging motor
SA–Overtravel–limit switch for the charging motor of the breaker
XT–Terminals for the secondary circuit of the breaker

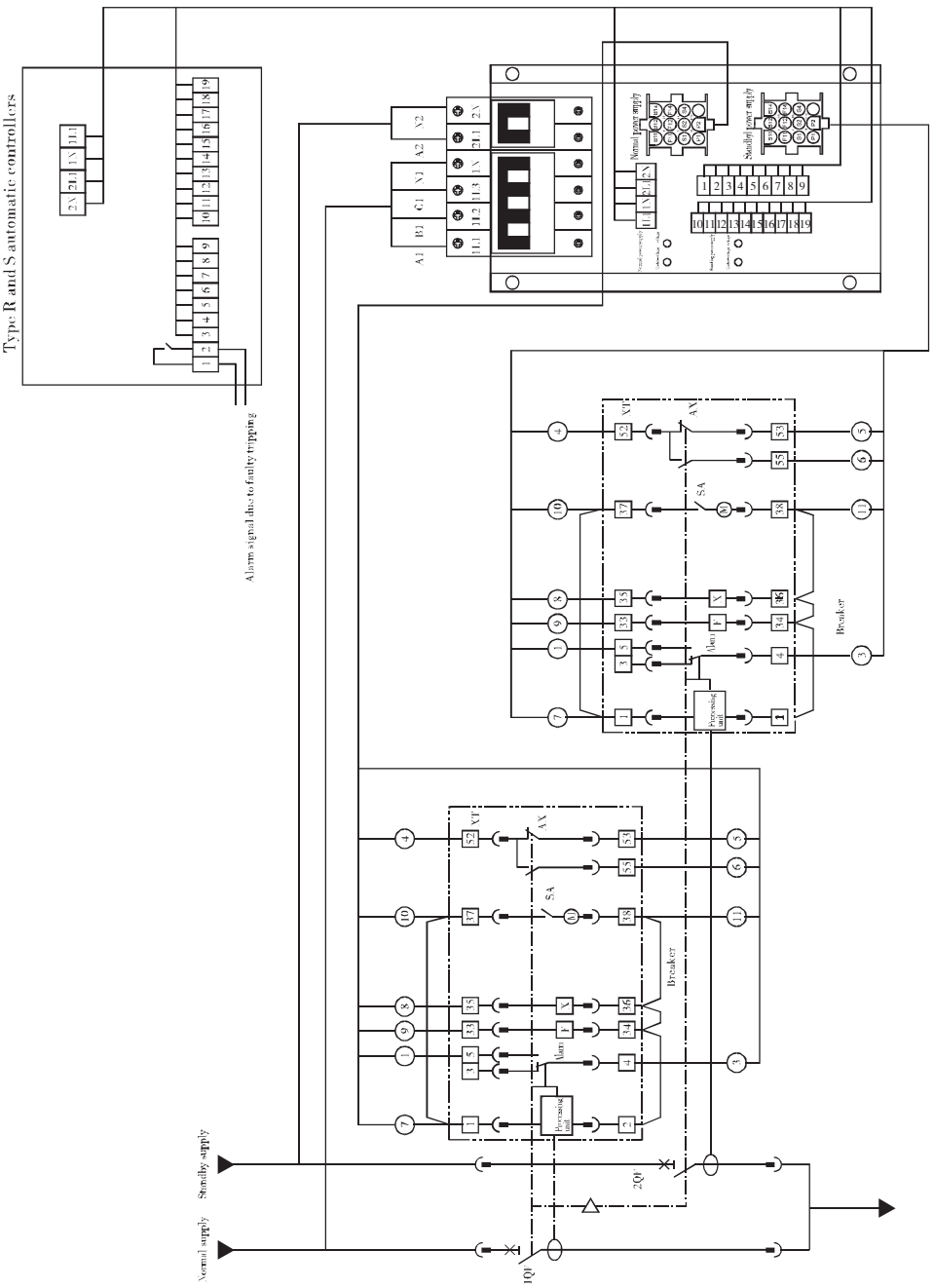
Wiring diagram of the automatic transfer switch (ATS) for nomal supply to power generating supply system
BT2-1600 circuit breakers and the auxiliary switch has four pairs of contacts



Note:1.As shown in the above diagram the breaker is open and connecting,it has been charged and there is no current in the loop.
2.When ATS is used DC24V voltage for intelligent controller,AC230V voltage for shunt release, closing magnet and automatic operation mechanism.

AX–Auxiliary switch
F–Shunt release
X–The electro-magnet to close the breaker
M–Charging motor
SA–Overtravel-limit switch for the charging motor of the breaker
XT–Terminals for the secondary circuit of the breaker

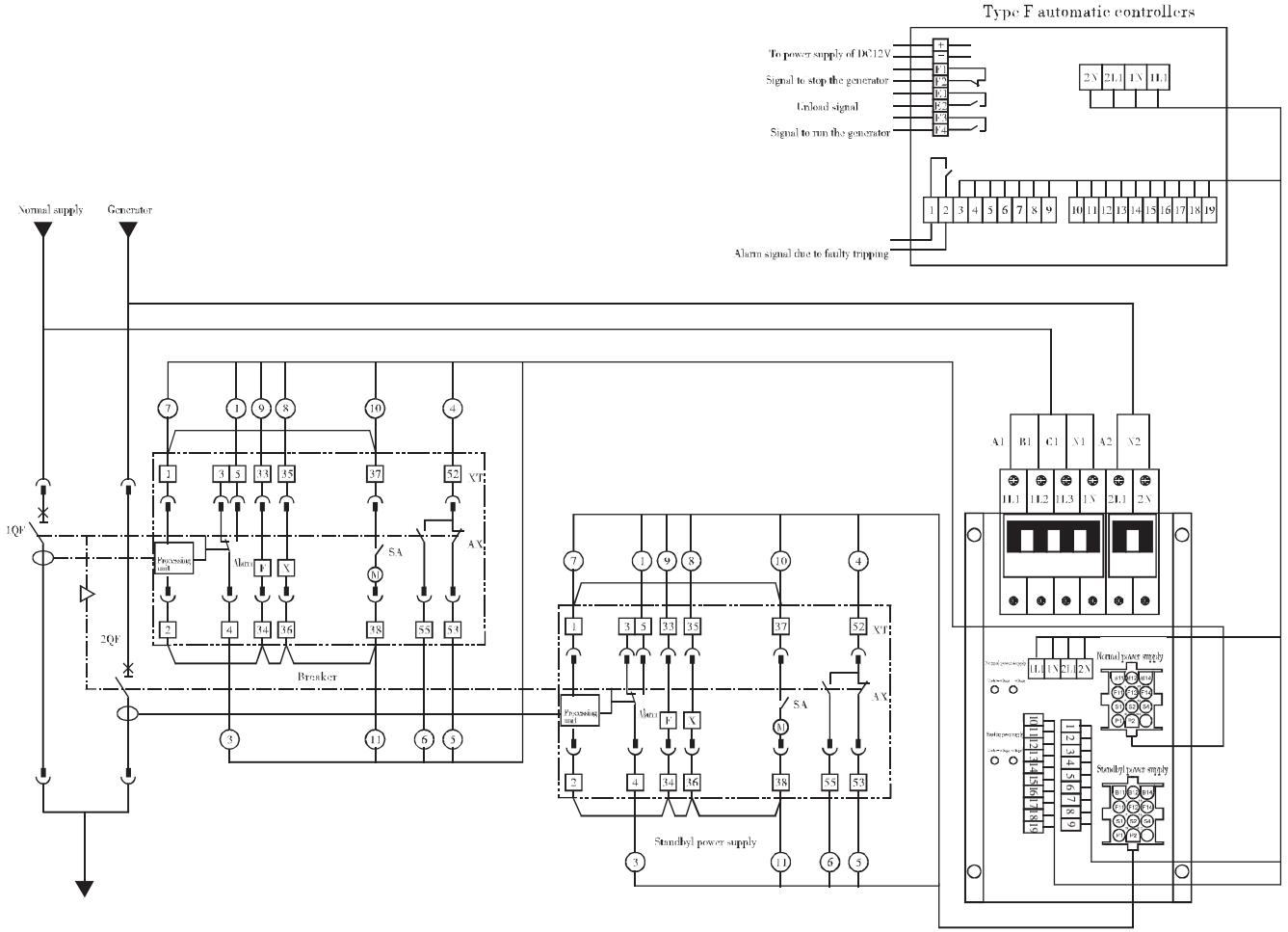
Wiring diagram of the automatic transfer switch (ATS) for normal supply to standby supply system
BT2-2000~6300 circuit breakers and the auxiliary switch has four pairs of changeover contacts



Note: 1. As shown in the above diagram the breaker is open and connecting, it has been charged and there is no current in the loop.
2. When ATS is used all voltage ratings are AC230V for intelligent controller, shunt release, closing magnet and automatic operation mechanism.

AX–Auxiliary switch
F–Shunt release
X–The electro-magnet to close the breaker
M–Charging motor
SA–Overtravel-limit switch for the charging motor of the breaker
XT–Terminals for the secondary circuit of the breaker

Wiring diagram of the automatic transfer switch (ATS) for normal supply to power generating supply system
BT2-2000~6300 circuit breakers and the auxiliary switch has four pairs of contacts



Note: 1.As shown in the above diagram the breaker is open and connecting,it has been charged and there is no current in the loop.
2.When ATS is used all voltage ratings are AC230V for intelligent controller,shunt release,closing magnet and automatic operation mechanism.

AX–Auxiliary switch
F–Shunt release
X–The electro–magnet to close the breaker
M–Charging motor
SA–Overtravel–limit switch for the charging motor of the breaker
XT–Terminals for the secondary circuit of the breaker

■ Ordering form

1. Users should make sure of their detailed acquaintance of the products' technological materials and make order by the "ordering form"in terms of future applicable situations of the circuit breakers.
2. The company would configure by"Factory's setting values of the intelligent release" if users had no requirements of protection parameters when making order.

Ordering form

(Please fill numbers in ☐ or mark √ in ☐)

Customer name		Order quantity		Date		
Type	BT2- ☐ / ☐ E		Rated voltage	☐ AC400V ☐ AC690V		
Use	☐ Standard ☐ Humid tropical (TH)		Rated current	In= ☐ A		
Connection	Fixed ☐ Horizontal (Rear connection) ☐ Vertical (Rear connection)					
	Draw-out ☐ Horizontal (Rear connection) ☐ Vertical (Rear connection)					
Intelligent controller (OCR)	Type selection	☐ Type L25	☐ Type M25	☐ Type M26	☐ Type H26	☐ Type P26	☐ Type P25
	Basic function	Current indication	LED current indication		LED current indication and communication function	LCD current indication and wattmeter function	
		Long-time delay overload protection Ir_1 ☐ t_1 ☐		Short-time delay short circuit protection Ir_2 ☐ t_2 ☐		Instantaneous short circuit protection Ir_3 ☐	
			Ground-fault protection Ir_4 ☐ t_4 ☐				
		Long-time delay overload protection				Long-time delay overload protection	
		General inverse time delay (I^2t)				☐ General inverse time delay (I^2t) ☐ Special inverse time delay (It) ☐ High-voltage fuse type (I^4t)	
		☐ 50%In ☐ 100%In (Select setting current of N line)				☐ OFF ☐ 50%In ☐ 100%In ☐ 200%In (200% In for three-pole breaker + neutral line transformer BT2-6300 except)	
		Test function MCR function Thermo-analogue function Alarm and fault indication					
			Contact wearing indication Fault memory Self-diagnosis				
	Selective function		☐ Indication of voltage				
			☐ ZSI function ☐ Load-monitoring function: ☐ Pattern one ☐ Pattern two				
						☐ Communication function ☐ Harmonic meter ☐ Current-imbalace display	
	Voltage of the intelligent controller	BT2-2000 and above	☐ AC230V ☐ AC400V			☐ DC220V ☐ DC110V Need to use with DC power supply module	
		BT2-1600	☐ DC24V Need be selectively equipped with DC24V power supply module	☐ AC230V ☐ AC400V Need to be selectively equipped power supply module			
Standard accessories	Shunt release	☐ AC230V	☐ AC400V	☐ DC110V	☐ DC220V		
	Closing coil	☐ AC230V	☐ AC400V	☐ DC110V	☐ DC220V		
	Power-driven operation mechanism	☐ AC230V	☐ AC400V	☐ DC110V	☐ DC220V		
	Auxiliary switch	Standard pattern ☐ 4 changeover contacts					
		Special pattern ☐ 4NO + 4NC ☐ 6NO + 2NC ☐ 2NO + 6NC					
Choice of accessories	☐ Under-voltage release	☐ AC230V ☐ AC400V					
		☐ Under-voltage instantaneous release	☐ Under-voltage time delay release ☐ 0.5s ☐ 1s ☐ 2s ☐ 3s				
	☐ Lock in "OFF" mechanism	One set of circuit breaker	☐ One lock and one key				
		Two sets of circuit breakers	☐ Two locks and one key				
		Three sets of circuit breakers	☐ Three locks and two keys				
	☐ Mechanical interlock	Two sets of circuit breakers ☐ Cable type interlock ☐ Rod type interlock					
		☐ Cable type interlock ☐ Pattern one of Rod type interlock ☐ Pattern two of Rod type interlock ☐ Pattern three of Rod type interlock					
	☐ Connection of external CT for neutral	☐ Draw out position indication	☐ Interphase barrier				
	☐ Ready to close indication	☐ Push button locking device	☐ Counter				
	Communication accessories	☐ Components of draw-out socket communication module ☐ Signal of ready-for-switching on ☐ Signal of under-voltage ☐ Signal of fault release					
	☐ DC power supply module ☐ DC220V ☐ DC110V	☐ DC24V power supply module					
	☐ Automatic transfer switch (ATS)	Automatic transfer switch (ATS) ☐ R type ☐ S type ☐ F type					

■ Ordering notice

Factory's setting values of intelligent controller

Overload long-time delay	Setting values of current I_{r1}	In			
	Setting values of delay time t_1	480s			
	Overload long-time delay of P25 and P26	I^2t			
Short circuit short-time delay	Setting values of current I_{r2}	$6I_{r1}$			
	Setting values of delay time t_2	0.2s			
Setting values of short circuit instantaneous current I_{r3}		15In (for In ≤ 1000A) 12In (for In = 1250A, 1600A) 10In (for In ≥ 2000A)			
Ground-fault (Not for L25, M25, P25)	Setting values of current I_{r4}	BT2-1600	BT2-2000 BT2-2500	BT2-4000	BT2-6300
		0.8In or 1000A To select the minimum	0.8In or 1200A To select the minimum	0.8In or 1600A To select the minimum	2000A
	Setting values of delay time t_4	0.4s			
Load-monitoring (Not for type L25, optional for type M25, M26, H26, P25 and P26)	Monitoring current I_{LC1}	In			
	Monitoring current I_{LC2}	In			

Catalog Disclaimer
The information contained in this catalog does not constitute an express or implied warranty of quality, any warranty of merchantability of fitness for a particular purpose is hereby disclaimed.

Since the user's product information, specific use application, and conditions of use are all outside of Fuji Electric FA Components & Systems'control, **it shall be the responsibility of the user to determine the suitability of any of the products mentioned for the user's application.**

One Year Limited Warranty
The products identified in this catalog shall be sold pursuant to the terms and conditions identified in the "Conditions of Sale" issued by Fuji Electric FA with each order confirmation.

Except to the extent otherwise provided for in the Conditions of Sale issued by Fuji Electric FA, Fuji Electric FA warrants that the Fuji Electric FA products identified in this catalog shall be free from significant defects in materials and workmanship provided the product has not been: 1) repaired or altered by others than Fuji Electric FA; 2) subjected to negligence, accident, misuse, or damage by circumstances beyond Fuji Electric FA's control; 3) improperly operated, maintained or stored; or 4) used in other than normal use or service. This warranty shall apply only to defects appearing within one (1) year from the date of shipment by Fuji Electric FA, and in such case, only if such defects are reported to Fuji Electric FA within thirty (30) days of discovery by purchaser. Such notice should be submitted in writing to Fuji Electric FA at 5-7, Nihonbashi Odemma-cho, Chuo-ku, Tokyo, Japan. The sole and exclusive remedy with respected to the above warranty whether such claim is based on warranty, contract, negligence, strict liability or any other theory, is limited to the repair or replacement of such product or, at Fuji Electric FA's option reimbursement by Fuji Electric FA of the purchase price paid to Fuji Electric FA for the particular product. **Fuji Electric FA does not make any other representations or warranties, whether oral or in writing, expressed or implied, including but not limited to any warranty regarding merchantability or fitness for a particular purpose.** Except as provided in the Conditions of Sale, no agent or representative of Fuji Electric FA is authorized to modify the terms of this warranty in writing or orally.

In no event shall Fuji Electric FA be liable for special, indirect or consequential damages, including but not limited to, loss of use of the product, other equipment, plant and power system which is installed with the product, loss of profits or revenues, cost of capital, or claims against the purchaser or user of the product by its customers resulting from the use of information, recommendations and descriptions contained herein. The purchaser agrees to pass on to its customers and users, in writing at the time inquiries and orders are received by buyer, Fuji Electric FA's warranty as set forth above.

⚠ Safety Considerations
- Operate (keep) in the environment specified in the operating instructions and manual. High temperature, high humidity, condensation, dust, corrosive gases, oil, organic solvents, excessive vibration or shock might cause electric shock, fire, erratic operation or failure.
- For safe operation, before using the product read the instruction manual or user manual that comes with the product carefully or consult the Fuji sales representative from which you purchased the product.
- Products introduced in this catalog have not been designed or manufactured for such applications in a system or equipment that will affect human bodies or lives.
- Customers, who want to use the products introduced in this catalog for special systems or devices such as for atomic-energy control, aerospace use, medical use, passenger vehicle, and traffic control, are requested to consult with Fuji Electric FA.
- Customers are requested to prepare safety measures when they apply the products introduced in this catalog to such systems or facilities that will affect human lives or cause severe damage to property if the products become faulty.
- For safe operation, wiring should be conducted only by qualified engineers who have sufficient technical knowledge about electrical work or wiring.
- Follow the regulations of industrial wastes when the product is to be discarded.
- For further questions, please contact your Fuji sales representative or Fuji Electric FA.